



Full wwPDB EM Validation Report ⓘ

Dec 11, 2022 – 08:39 pm GMT

PDB ID : 6T59
EMDB ID : EMD-10380
Title : Structure of rabbit 80S ribosome translating beta-tubulin in complex with tetratricopeptide protein 5 and nascent chain-associated complex
Authors : Lin, Z.; Gasic, I.; Chandrasekaran, V.; Peters, N.; Shao, S.; Ramakrishnan, V.; Mitchison, T.J.; Hegde, R.S.
Deposited on : 2019-10-15
Resolution : 3.11 Å(reported)

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

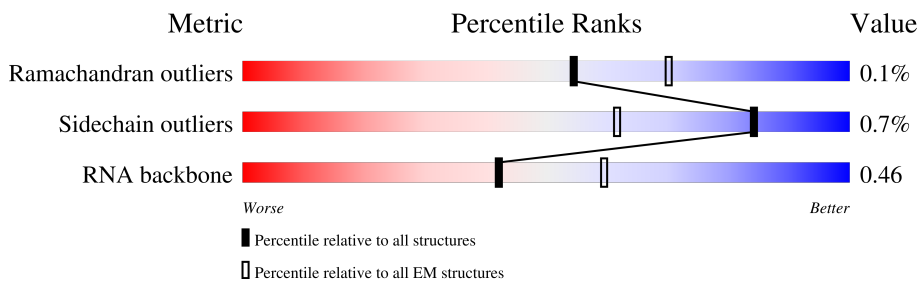
EMDB validation analysis : 0.0.1.dev43
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.3

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.11 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A3	257	
2	B3	403	
3	C3	425	
4	D3	297	
5	E3	291	
6	F3	247	
7	G3	319	
8	H3	192	

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Mol	Chain	Length	Quality of chain
9	I3	214	80% 95%
10	J3	178	73% 96%
11	L3	211	81% 98%
12	M3	218	48% 63% 37%
13	N3	204	84% 98%
14	O3	203	75% 97%
15	P3	184	69% 83% 17%
16	Q3	188	88% 99%
17	R3	196	63% 79% 21%
18	S3	176	82% 98%
19	T3	160	85% 99%
20	U3	128	68% 80% 20%
21	V3	140	85% 93% 6%
22	W3	157	34% 40% 60%
23	X3	156	63% 75% 24%
24	Y3	145	78% 91% 8%
25	Z3	136	78% 99%
26	a3	148	78% 99%
27	b3	226	38% 46% 54%
28	c3	115	63% 84% 15%
29	d3	125	74% 84% 14%
30	e3	135	79% 93% 5%
31	f3	110	74% 99%
32	g3	116	86% 98%
33	h3	123	77% 99%

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Mol	Chain	Length	Quality of chain
34	i3	105	79% 97%
35	j3	97	68% 86% 11%
36	k3	70	84% 99%
37	l3	51	80% 98%
38	m3	102	41% 51% 49%
39	n3	25	100% 100%
40	o3	106	81% 98%
41	p3	92	74% 96%
42	r3	137	78% 91% 9%
43	s3	318	58% 61% 38%
44	t3	165	92% 91% 7%
45	23	76	99% 82% 18%
46	54	3543	73% 76% 24%
47	74	120	65% 88% 12%
48	84	156	68% 76% 21%
49	NI	29	90% 97%
50	NA	215	25% 25% 75%
51	NB	206	28% 28% 72%
52	TT	440	92% 96%
53	1	64	55% 44% 12% 44%

2 Entry composition

There are 55 unique types of molecules in this entry. The entry contains 143047 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Ribosomal protein L8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A3	248	Total	C	N	O	S	0	0
			1898	1189	389	314	6		

- Molecule 2 is a protein called uL3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B3	394	Total	C	N	O	S	0	0
			3172	2020	597	542	13		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B3	1	MET	-	initiating methionine	UNP G1TL06

- Molecule 3 is a protein called uL4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C3	362	Total	C	N	O	S	0	0
			2883	1812	577	480	14		

- Molecule 4 is a protein called 60S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D3	293	Total	C	N	O	S	0	0
			2391	1512	438	427	14		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D3	1	MET	-	initiating methionine	UNP G1SYJ6

- Molecule 5 is a protein called 60S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E3	216	1729	1115	329	282	3	0	0

- Molecule 6 is a protein called Ul30.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	F3	225	1875	1205	358	303	9	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F3	61	ARG	GLY	conflict	UNP G1TUB1
F3	93	ARG	GLY	conflict	UNP G1TUB1
F3	131	MET	VAL	conflict	UNP G1TUB1
F3	153	ILE	VAL	conflict	UNP G1TUB1

- Molecule 7 is a protein called eL8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	G3	233	1879	1199	361	315	4	0	0

- Molecule 8 is a protein called uL6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	H3	190	1516	954	284	272	6	0	0

- Molecule 9 is a protein called 60S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	I3	205	1664	1056	321	274	13	0	0

- Molecule 10 is a protein called Ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	J3	170	1362	861	254	241	6	0	0

- Molecule 11 is a protein called eL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	L3	210	Total	C	N	O	S	0	0
			1702	1065	354	279	4		

- Molecule 12 is a protein called Ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	M3	138	Total	C	N	O	S	0	0
			1137	727	221	182	7		

- Molecule 13 is a protein called Ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	N3	203	Total	C	N	O	S	0	0
			1701	1072	359	266	4		

- Molecule 14 is a protein called uL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	O3	199	Total	C	N	O	S	0	0
			1630	1051	319	255	5		

- Molecule 15 is a protein called uL22.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	P3	153	Total	C	N	O	S	0	0
			1242	777	241	215	9		

- Molecule 16 is a protein called eL18.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	Q3	187	Total	C	N	O	S	0	0
			1514	946	315	249	4		

- Molecule 17 is a protein called eL19.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	R3	155	Total	C	N	O	S	0	0
			1294	808	278	199	9		

- Molecule 18 is a protein called eL20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	S3	176	1462	930	285	236	11	0	0

- Molecule 19 is a protein called eL21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	T3	159	1298	823	252	217	6	0	0

- Molecule 20 is a protein called eL22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	U3	102	834	534	146	152	2	0	0

- Molecule 21 is a protein called Ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	V3	131	979	618	184	172	5	0	0

- Molecule 22 is a protein called eL24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	W3	63	528	337	103	85	3	0	0

- Molecule 23 is a protein called uL23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	X3	118	967	618	181	167	1	0	0

- Molecule 24 is a protein called Ribosomal protein L26.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	Y3	134	1115	700	226	186	3	0	0

- Molecule 25 is a protein called 60S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	Z3	135	Total	C	N	O	S	0	0
			1107	714	208	182	3		

- Molecule 26 is a protein called uL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	a3	147	Total	C	N	O	S	0	0
			1162	734	239	185	4		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
a3	1	MET	-	initiating methionine	UNP G1SNY0

- Molecule 27 is a protein called eL29.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	b3	104	Total	C	N	O	S	0	0
			848	527	189	129	3		

- Molecule 28 is a protein called eL30.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	c3	98	Total	C	N	O	S	0	0
			761	481	134	140	6		

- Molecule 29 is a protein called eL31.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	d3	107	Total	C	N	O	S	0	0
			888	560	171	155	2		

- Molecule 30 is a protein called eL32.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	e3	128	Total	C	N	O	S	0	0
			1053	667	216	165	5		

- Molecule 31 is a protein called eL33.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	f3	109	876	555	174	143	4	0	0

- Molecule 32 is a protein called eL34.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	g3	114	906	566	187	147	6	0	0

- Molecule 33 is a protein called uL29.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	h3	122	1013	640	204	168	1	0	0

- Molecule 34 is a protein called 60S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	i3	102	830	520	176	129	5	0	0

- Molecule 35 is a protein called Ribosomal protein L37.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	j3	86	705	434	155	111	5	0	0

- Molecule 36 is a protein called eL38.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	k3	69	569	366	103	99	1	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
k3	24	LYS	ASN	conflict	UNP G1U001

- Molecule 37 is a protein called eL39.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	l3	50	Total	C	N	O	S	0	0
			447	286	96	64	1		

- Molecule 38 is a protein called eL40.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	m3	52	Total	C	N	O	S	0	0
			429	266	90	67	6		

- Molecule 39 is a protein called 60s ribosomal protein l41.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	n3	25	Total	C	N	O	S	0	0
			239	145	64	27	3		

- Molecule 40 is a protein called eL42.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	o3	104	Total	C	N	O	S	0	0
			851	533	174	138	6		

- Molecule 41 is a protein called eL43.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	p3	91	Total	C	N	O	S	0	0
			708	445	136	120	7		

- Molecule 42 is a protein called eL28.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	r3	124	Total	C	N	O	S	0	0
			994	616	205	167	6		

- Molecule 43 is a protein called uL10.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	s3	196	Total	C	N	O	S	0	0
			1507	959	263	276	9		

- Molecule 44 is a protein called Ribosomal protein L12.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	t3	153	Total	C	N	O	S	0	0
			1160	722	218	217	3		

- Molecule 45 is a RNA chain called P-site tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	23	76	Total	C	N	O	P	0	0
			1616	723	291	527	75		

- Molecule 46 is a RNA chain called 28S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	54	3543	Total	C	N	O	P	0	0
			75972	33833	13910	24686	3543		

- Molecule 47 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	74	120	Total	C	N	O	P	0	0
			2558	1141	456	842	119		

- Molecule 48 is a RNA chain called 5.8S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	84	151	Total	C	N	O	P	0	0
			3208	1432	564	1062	150		

- Molecule 49 is a protein called Nascent polypeptide-associated complex subunit alpha N-terminal region.

Mol	Chain	Residues	Atoms				AltConf	Trace
49	NI	29	Total	C	N	O	0	0
			150	92	29	29		

- Molecule 50 is a protein called Nascent polypeptide-associated complex subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	NA	54	Total	C	N	O	S	0	0
			420	270	71	78	1		

- Molecule 51 is a protein called Transcription factor BTF3.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	NB	58	Total	C	N	O	S	0	0
			444	278	76	88	2		

- Molecule 52 is a protein called Tetratricopeptide repeat protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	TT	426	Total	C	N	O	S	0	0
			3337	2097	580	647	13		

- Molecule 53 is a protein called Tubulin Beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	1	36	Total	C	N	O	S	0	0
			292	184	51	55	2		

- Molecule 54 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
54	P3	2	Total	Mg	0
			2	2	
54	V3	1	Total	Mg	0
			1	1	
54	a3	1	Total	Mg	0
			1	1	
54	g3	1	Total	Mg	0
			1	1	
54	j3	1	Total	Mg	0
			1	1	
54	54	201	Total	Mg	0
			201	201	
54	74	7	Total	Mg	0
			7	7	
54	84	6	Total	Mg	0
			6	6	

- Molecule 55 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
55	g3	1	Total	Zn	0
			1	1	
55	j3	1	Total	Zn	0
			1	1	

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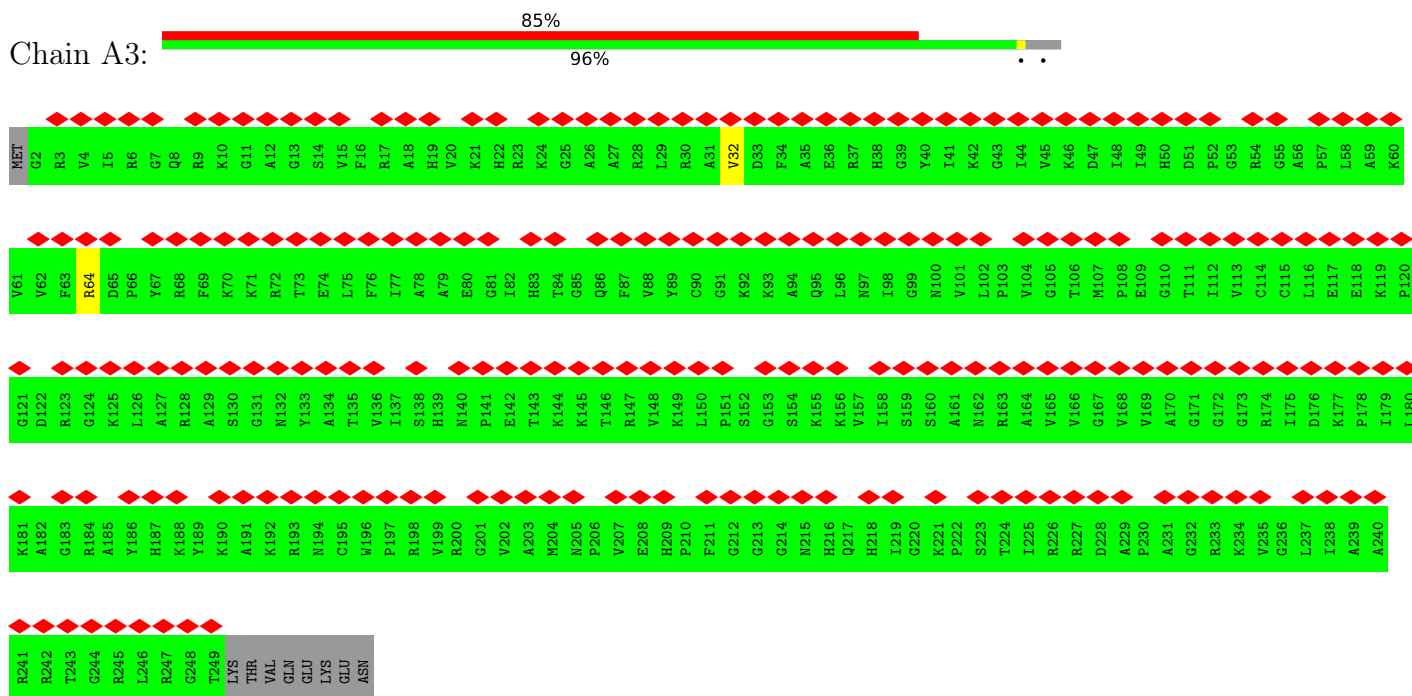
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Mol	Chain	Residues	Atoms		AltConf
55	m3	1	Total 1	Zn 1	0
55	o3	1	Total 1	Zn 1	0
55	p3	1	Total 1	Zn 1	0

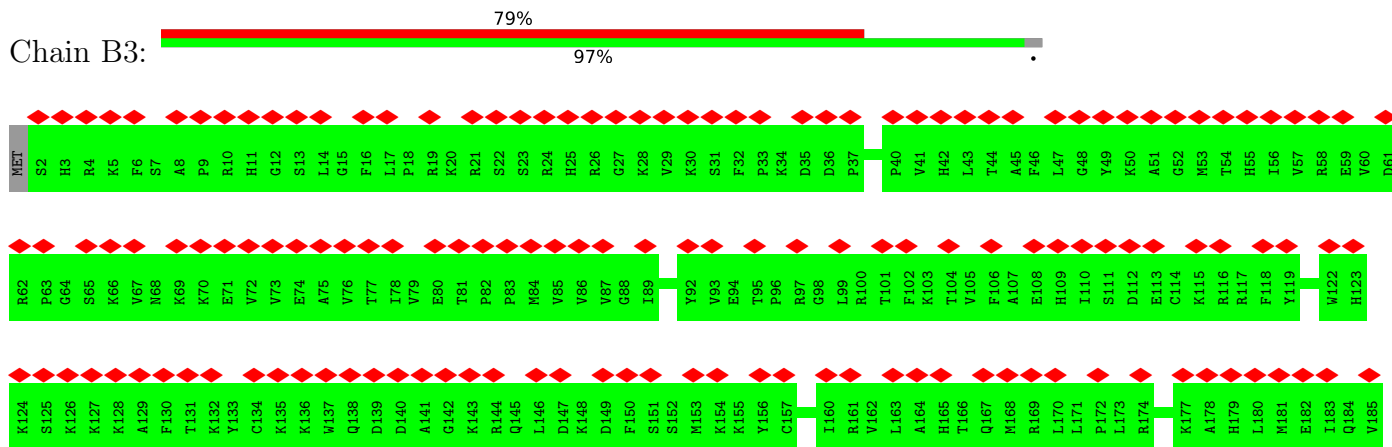
3 Residue-property plots

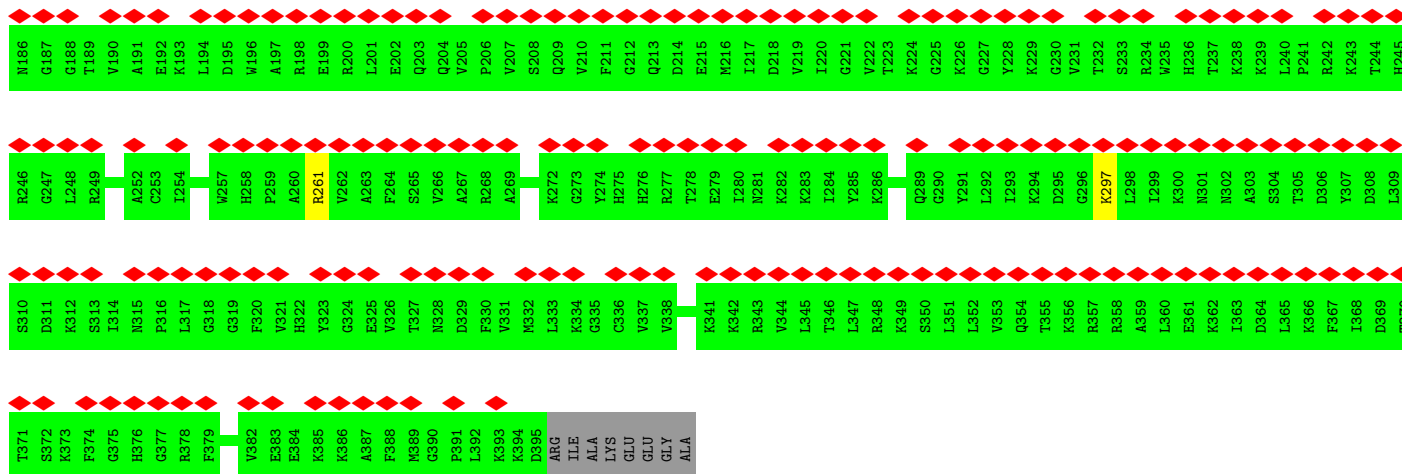
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Ribosomal protein L8

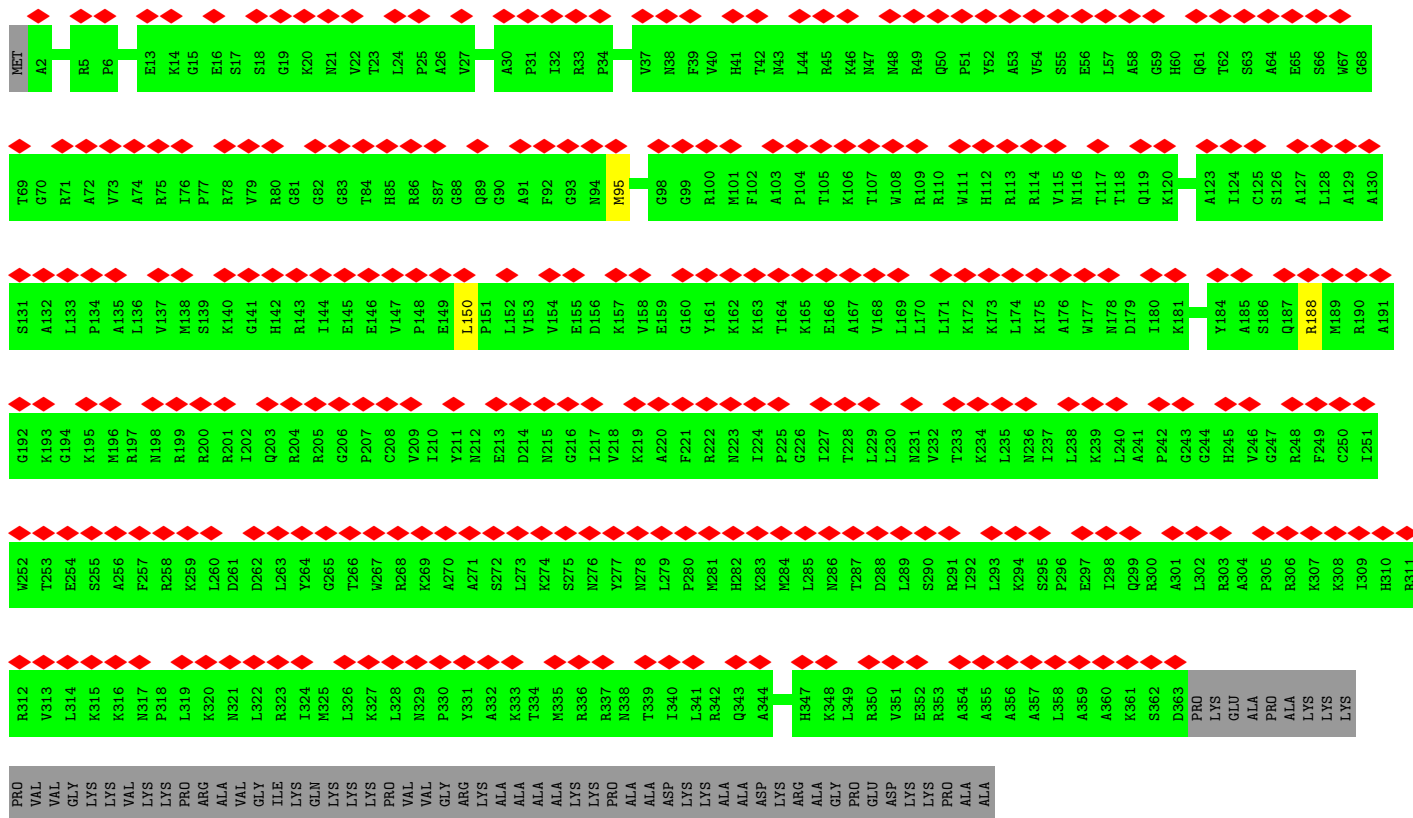
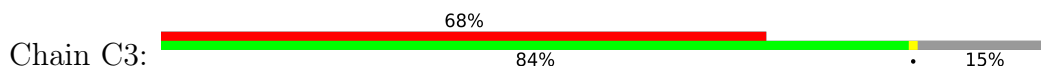


- Molecule 2: uL3

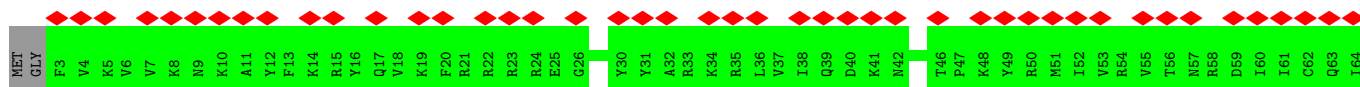
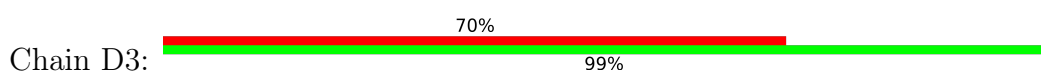


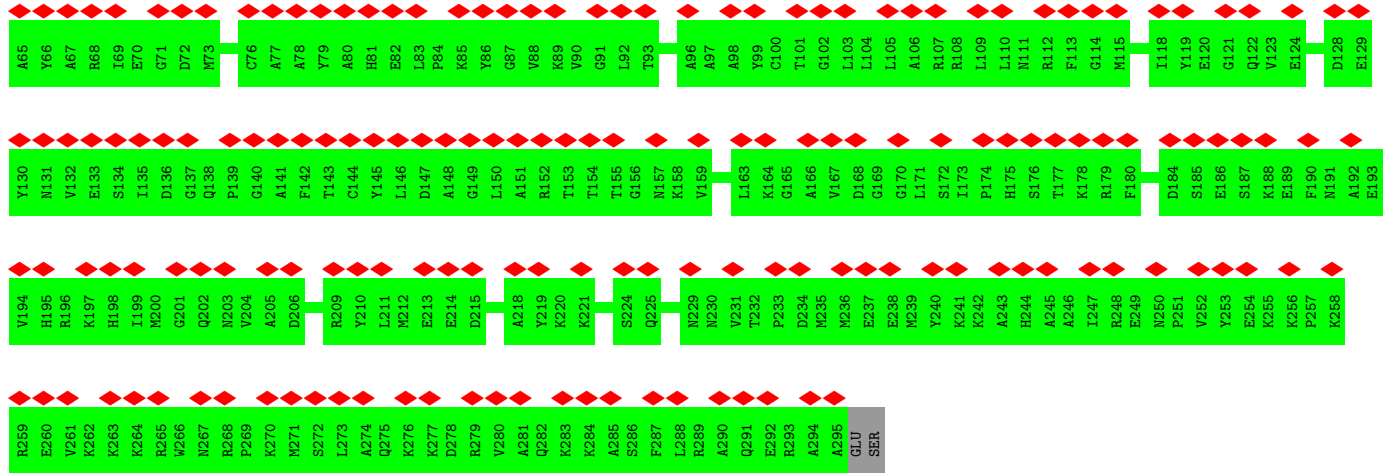


• Molecule 3: uL4

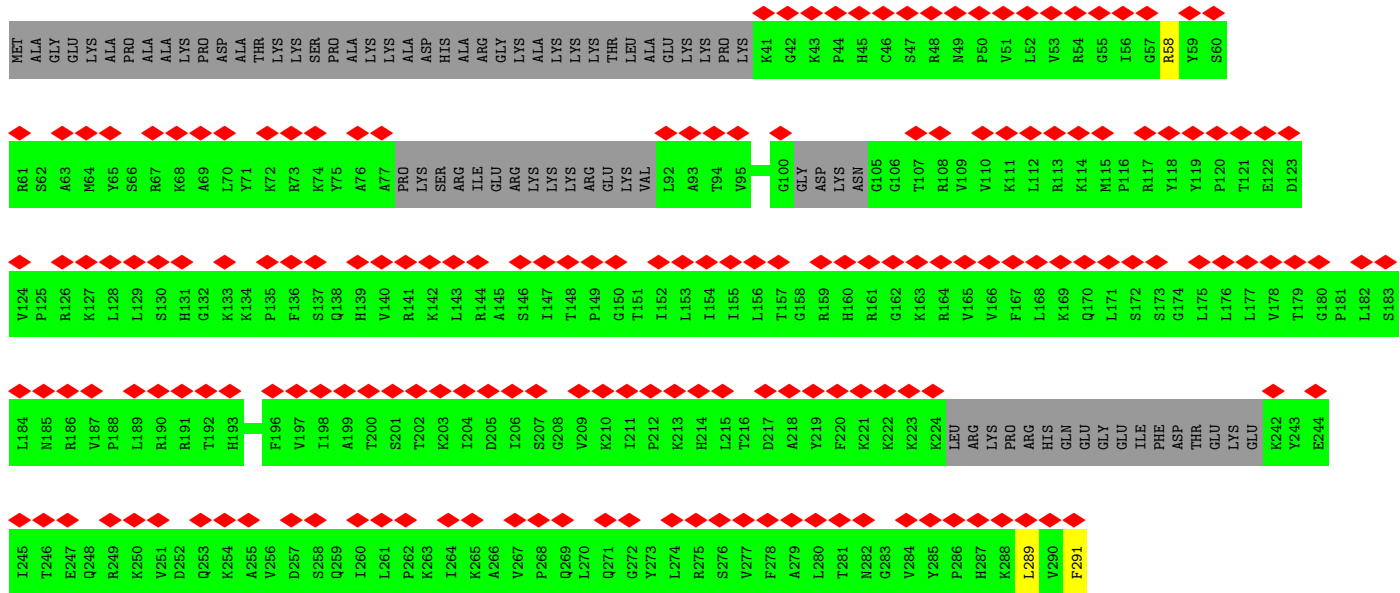
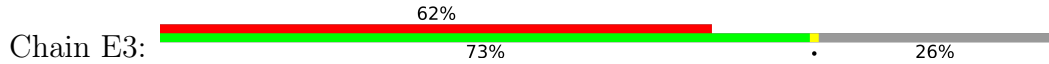


• Molecule 4: 60S ribosomal protein L5

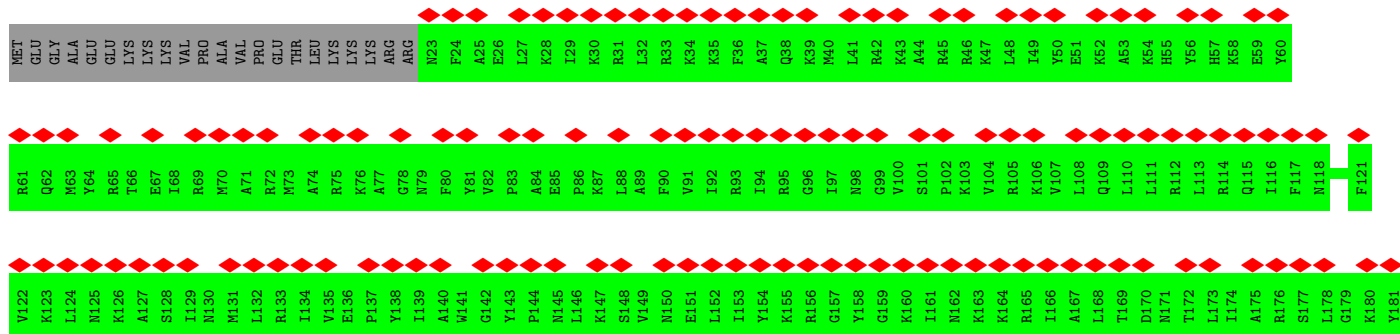
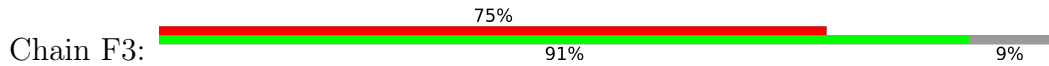


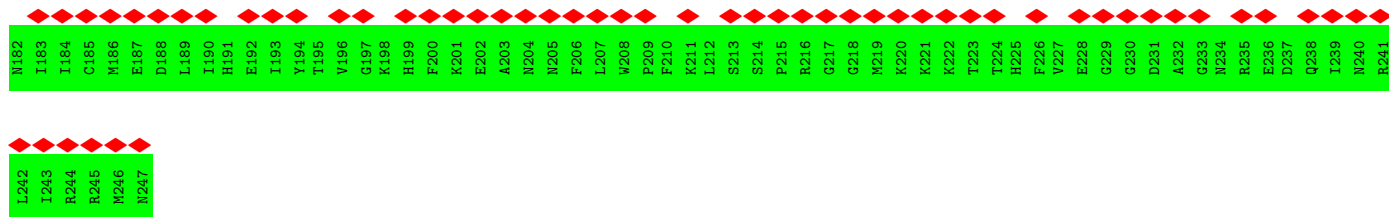


● Molecule 5: 60S ribosomal protein L6

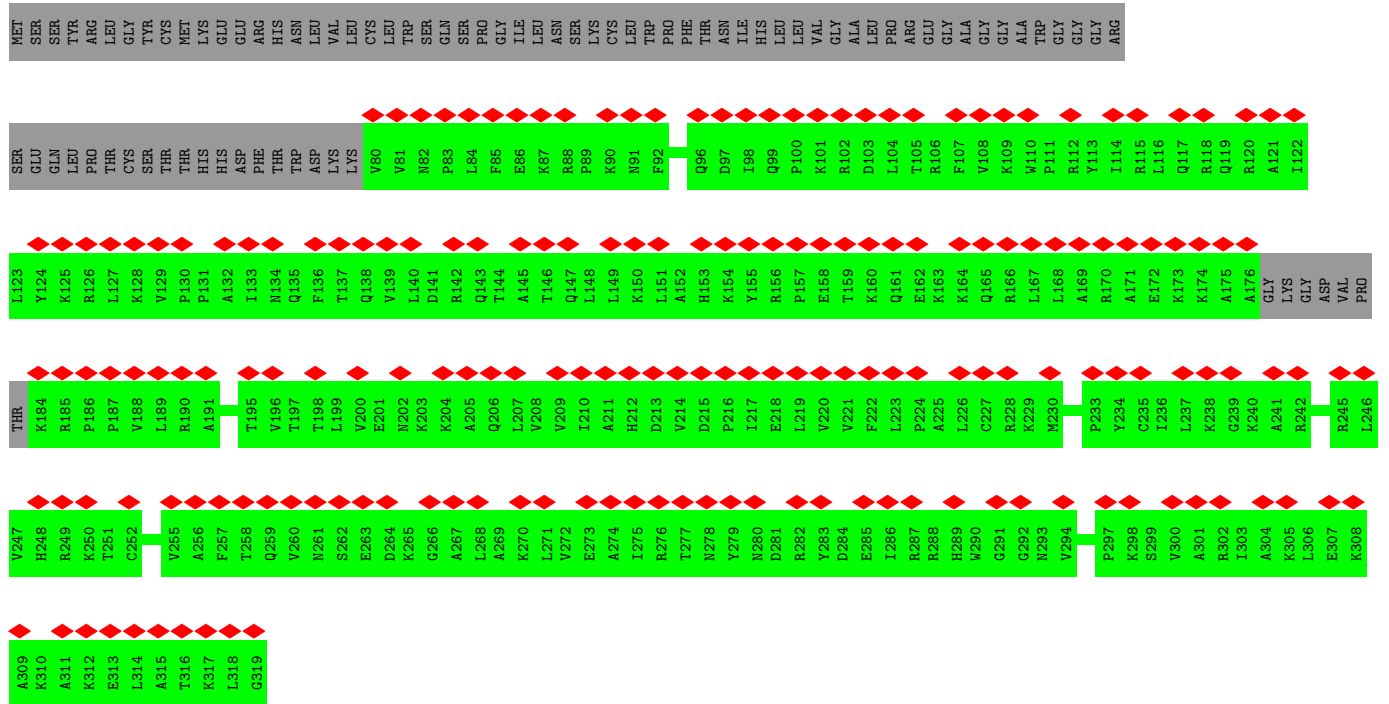
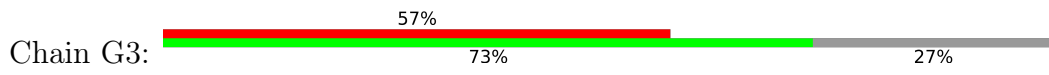


● Molecule 6: U130

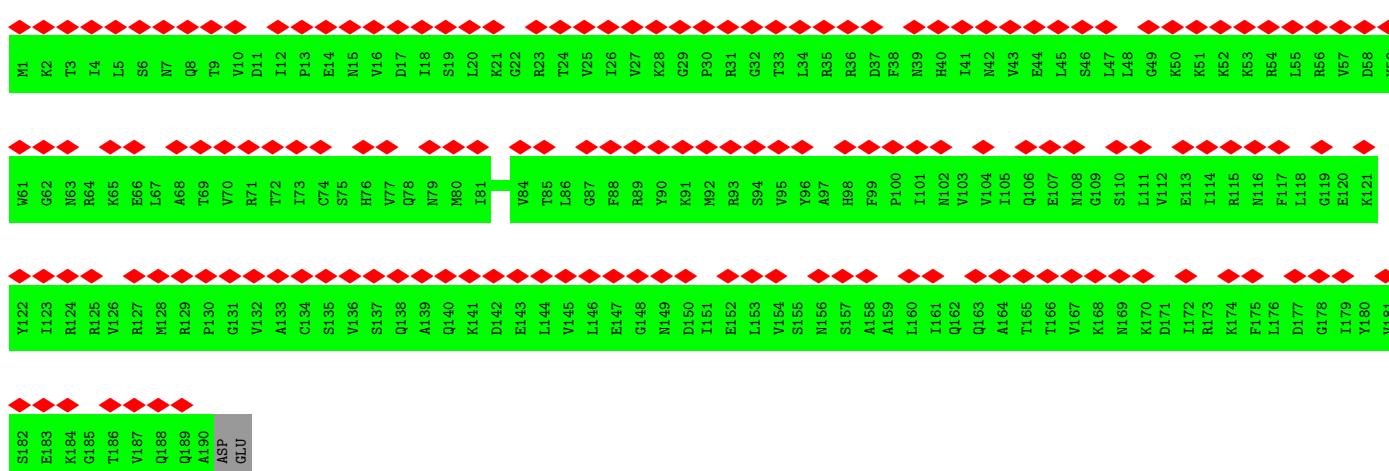
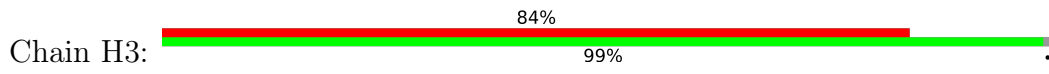




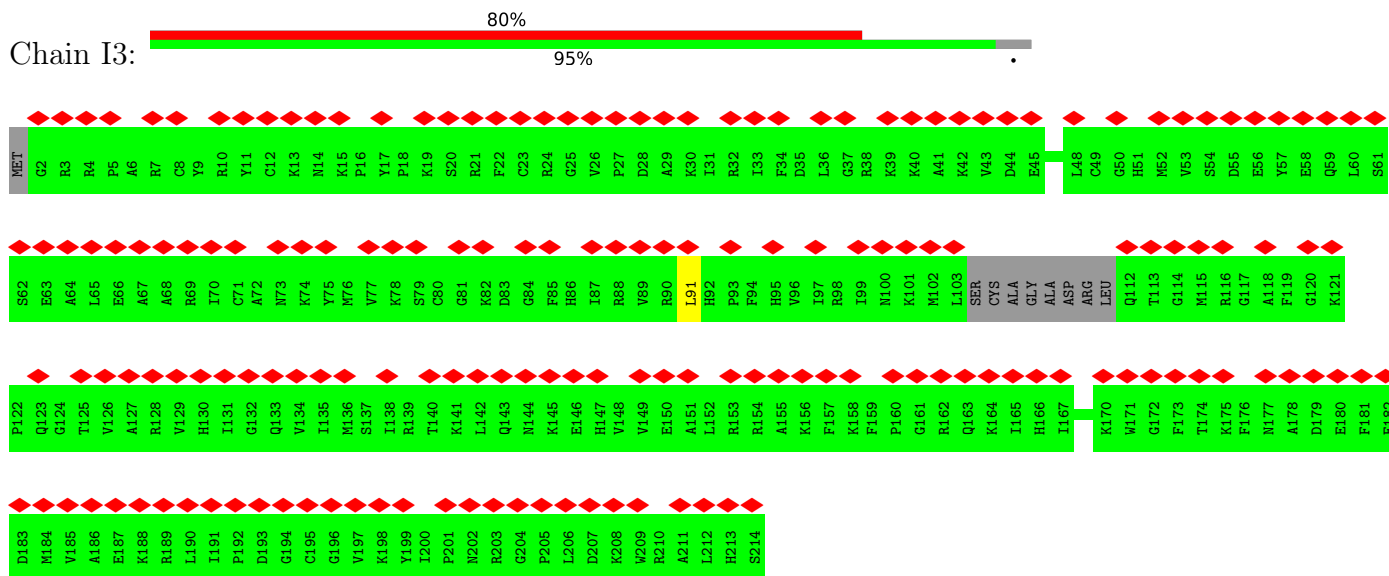
• Molecule 7: eL8



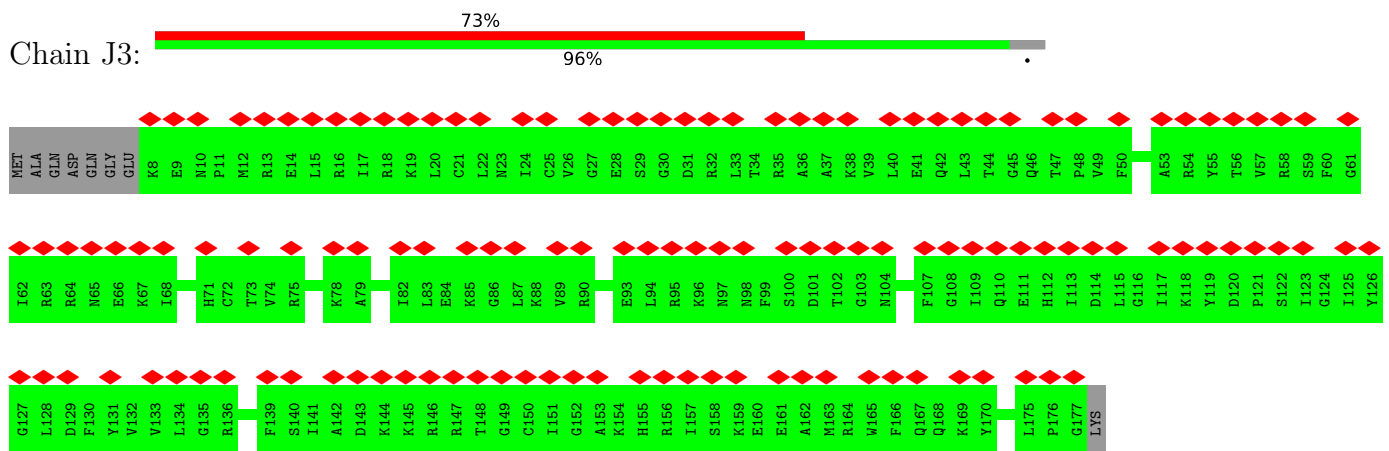
• Molecule 8: uL6



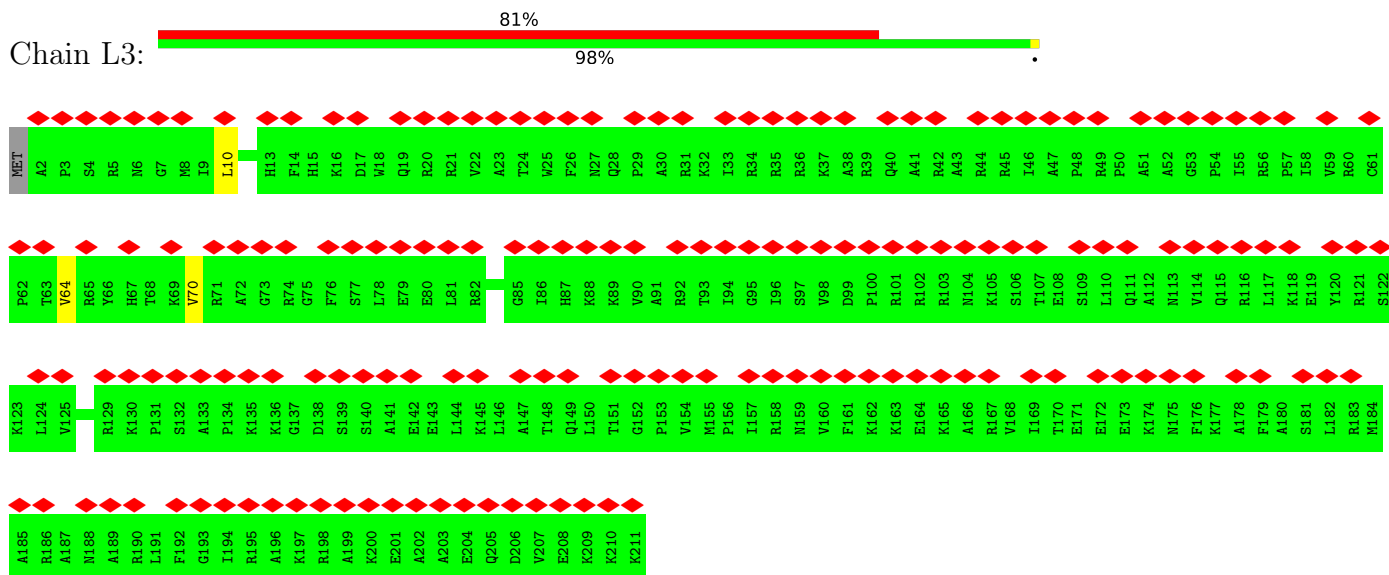
• Molecule 9: 60S ribosomal protein L10



• Molecule 10: Ribosomal protein L11

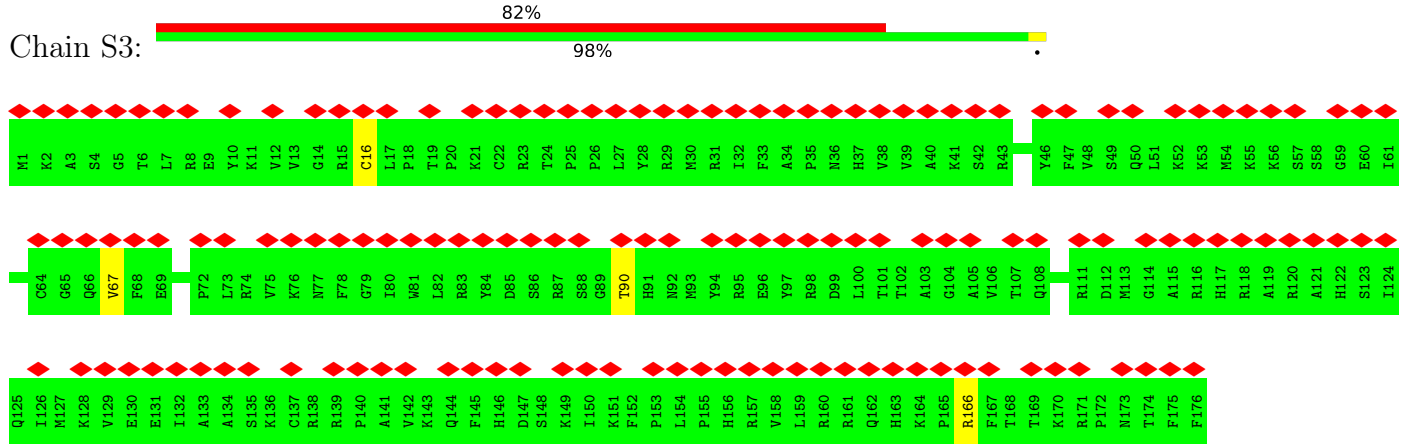


• Molecule 11: eL13

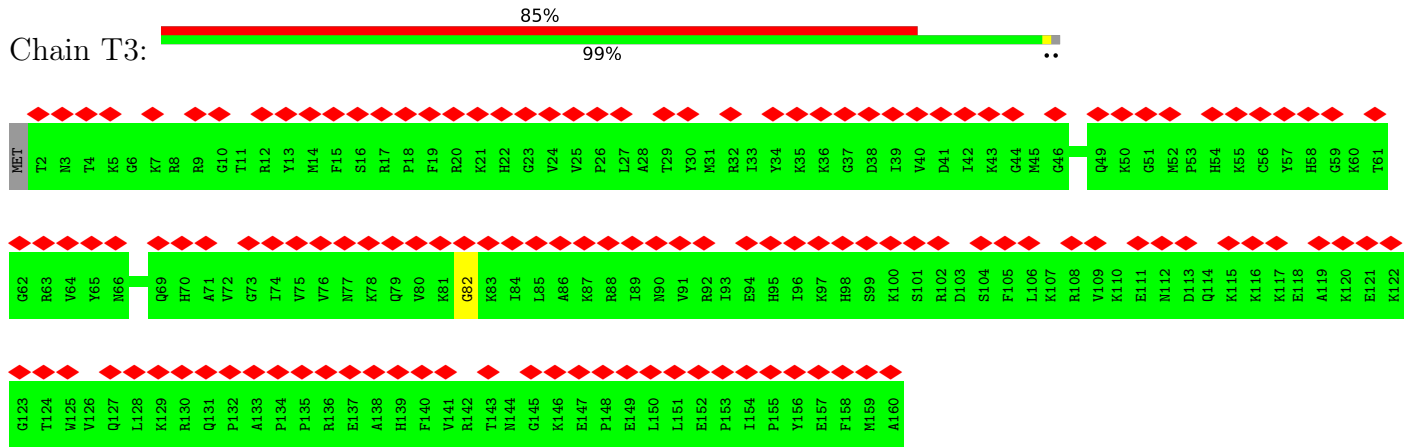


ILE
ILE
LYS
THR
LEU
SER
LYS
GLU
GLU
THR
LYS
LYS

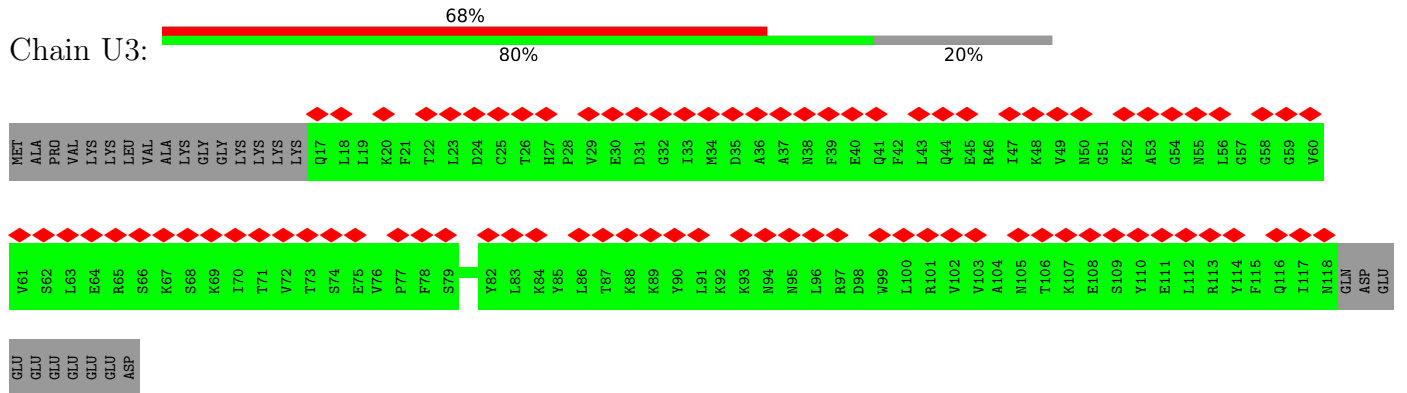
- Molecule 18: eL20



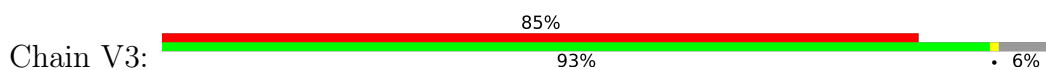
- Molecule 19: eL21

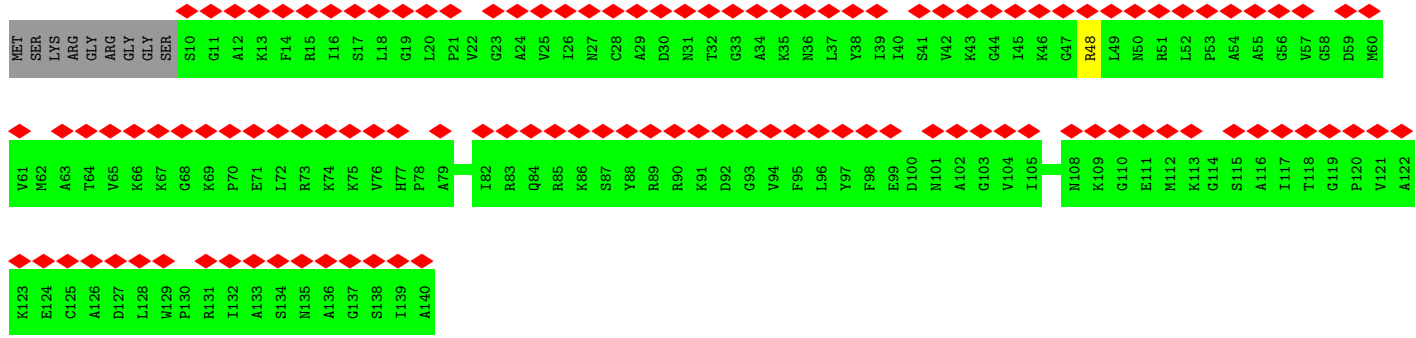


- Molecule 20: eL22

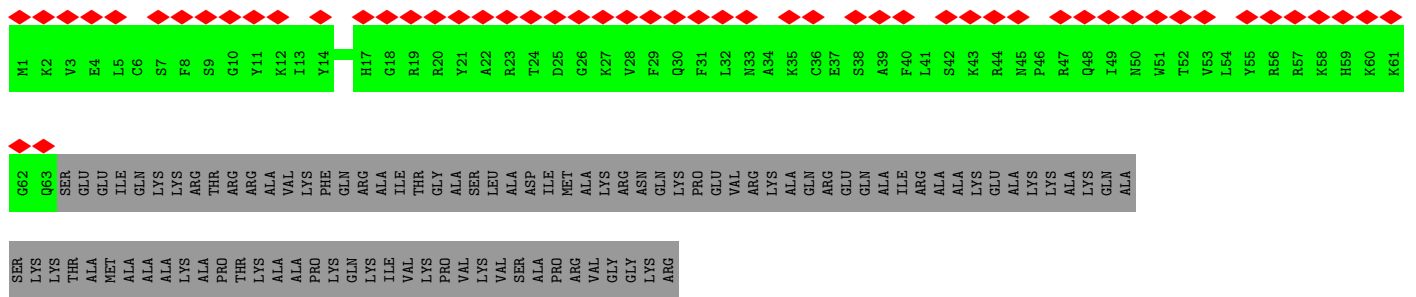


- Molecule 21: Ribosomal protein L23

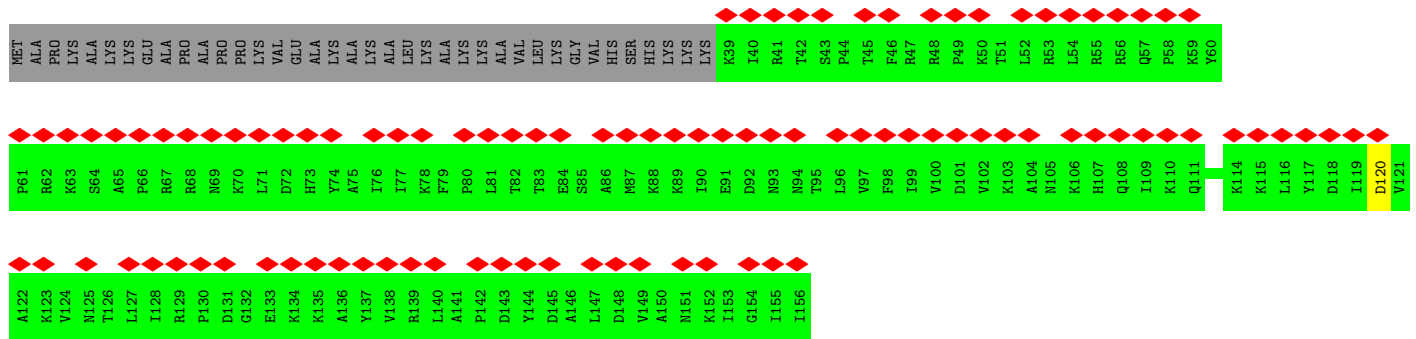
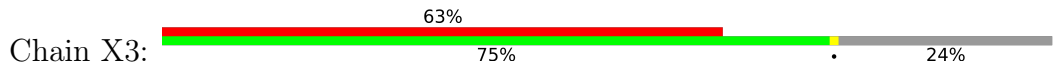




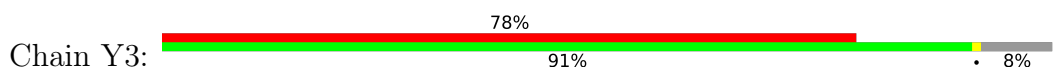
• Molecule 22: eL24

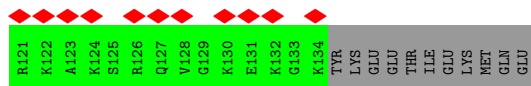


• Molecule 23: uL23

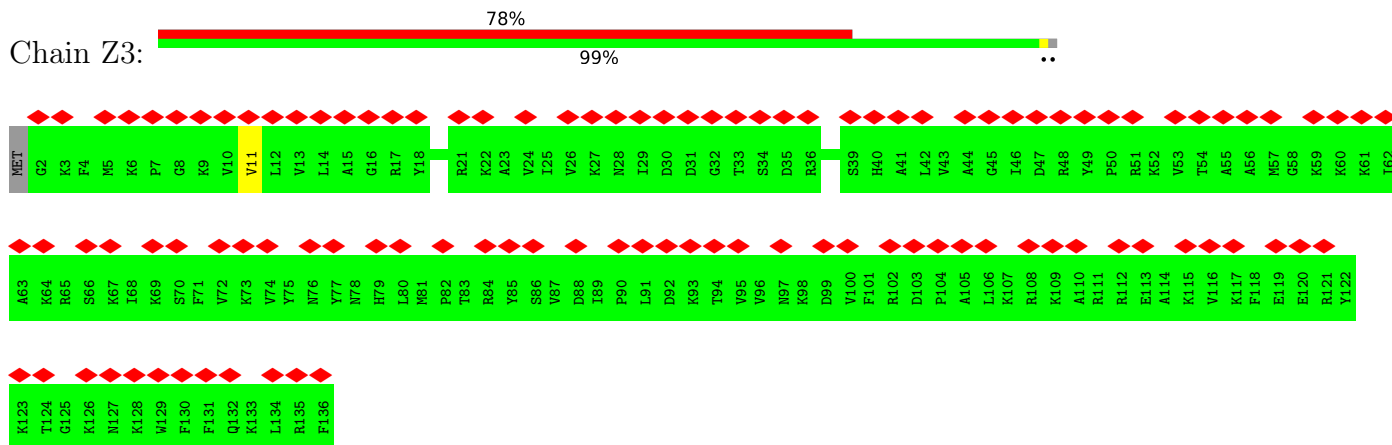


• Molecule 24: Ribosomal protein L26

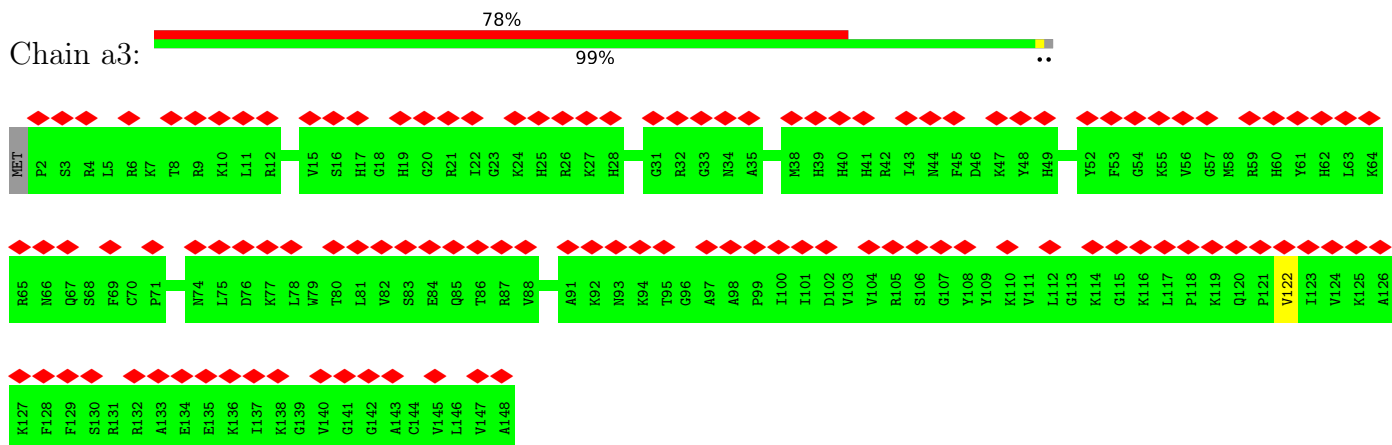




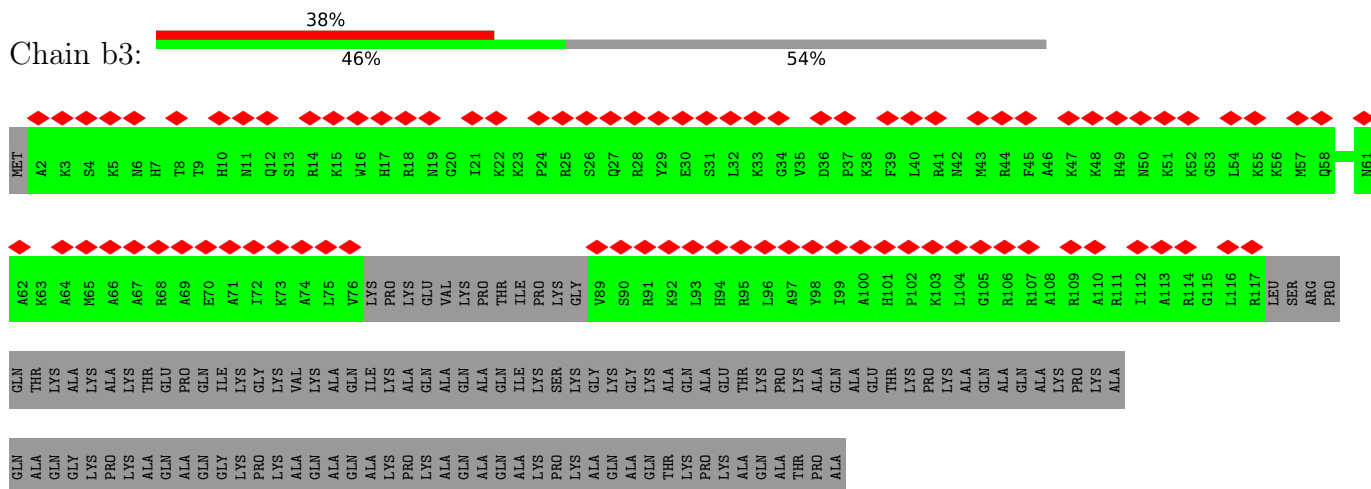
• Molecule 25: 60S ribosomal protein L27



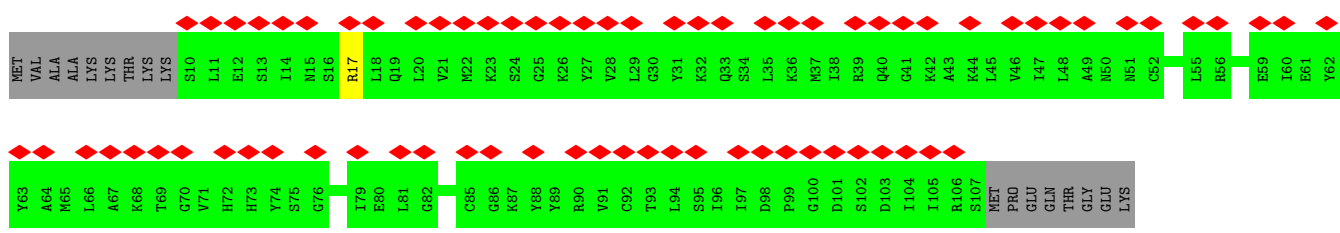
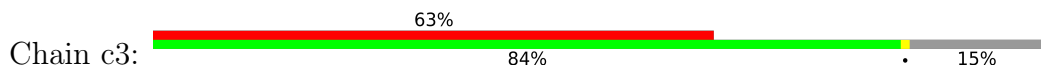
• Molecule 26: uL15



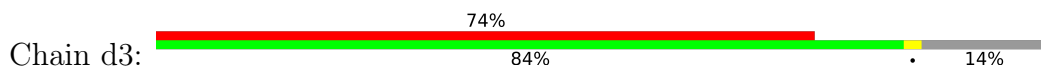
• Molecule 27: eL29



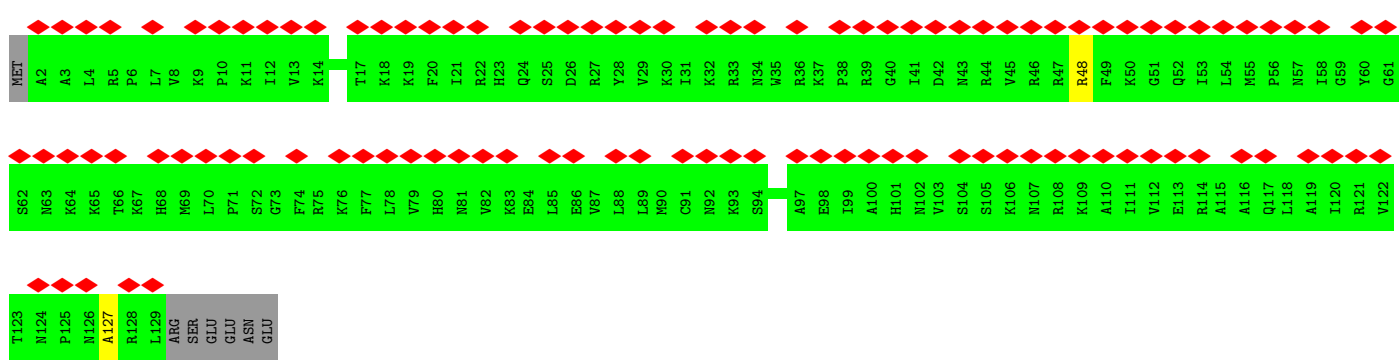
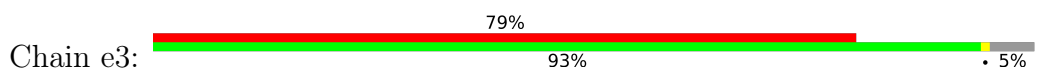
• Molecule 28: eL30



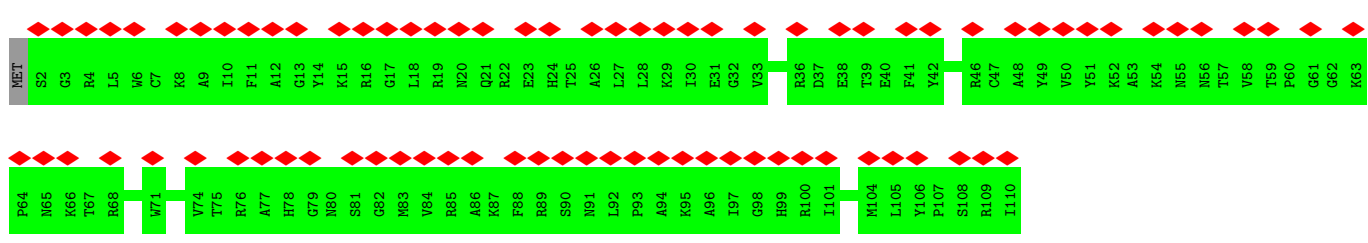
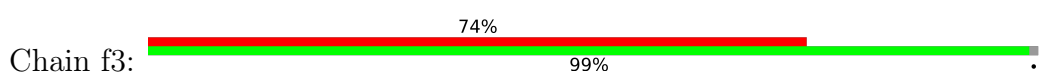
• Molecule 29: eL31



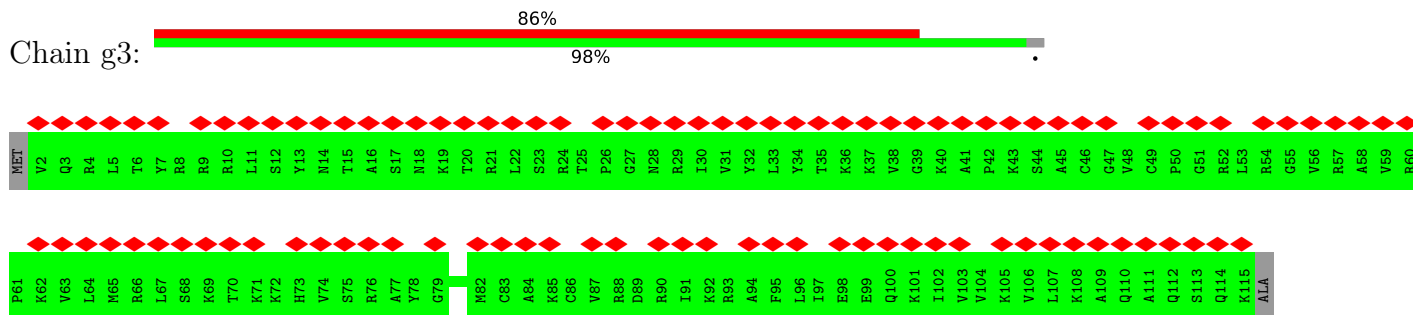
• Molecule 30: eL32



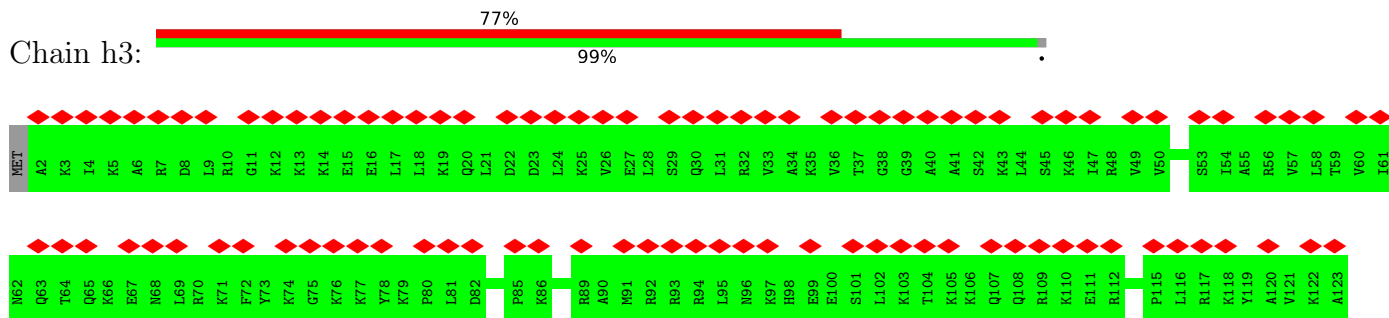
• Molecule 31: eL33



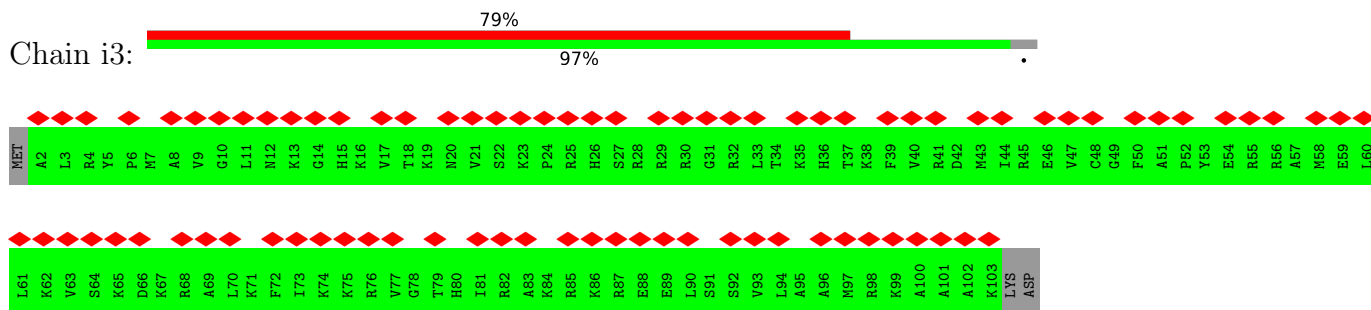
• Molecule 32: eL34



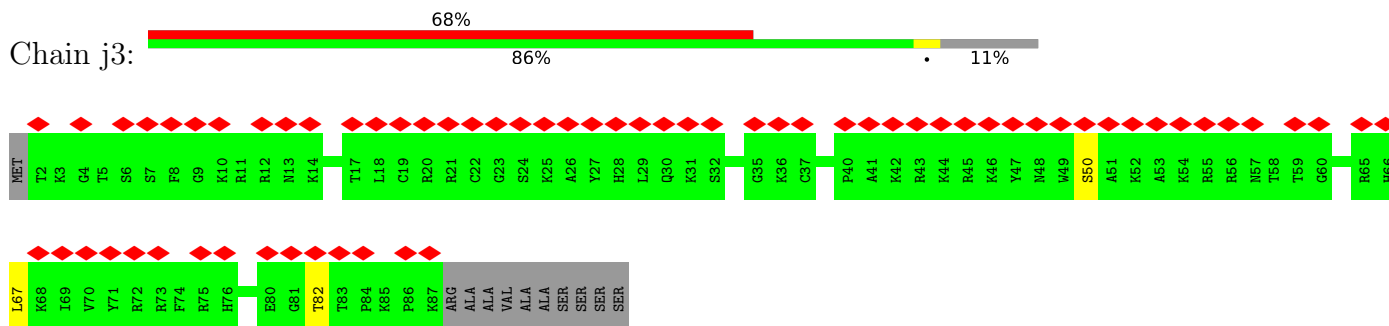
• Molecule 33: uL29



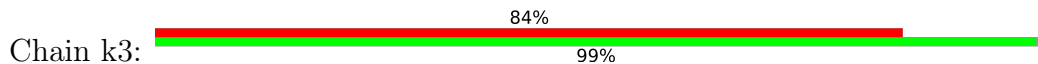
• Molecule 34: 60S ribosomal protein L36

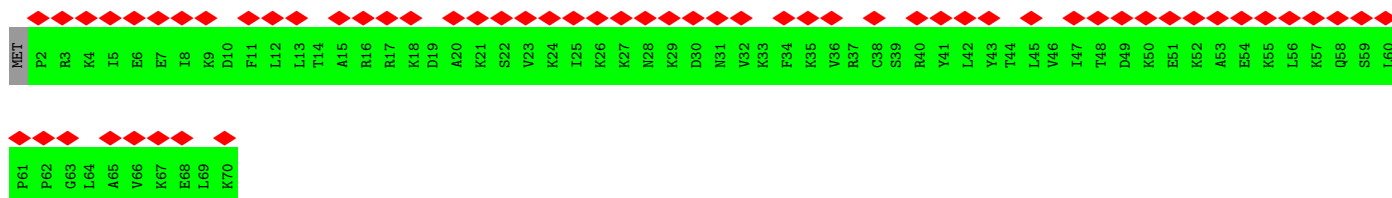


• Molecule 35: Ribosomal protein L37

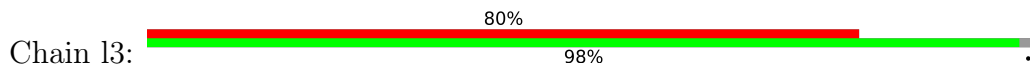


• Molecule 36: eL38

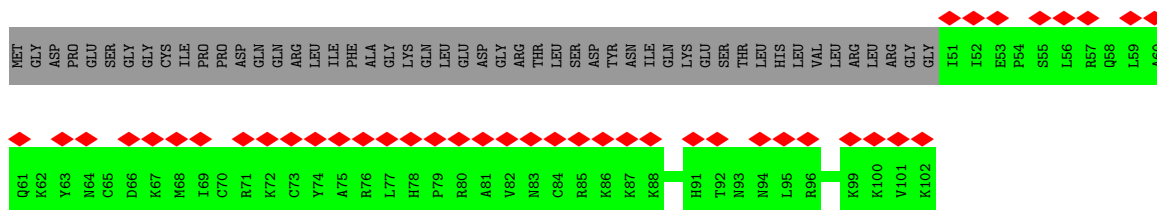
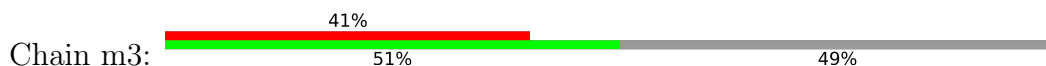




• Molecule 37: eL39



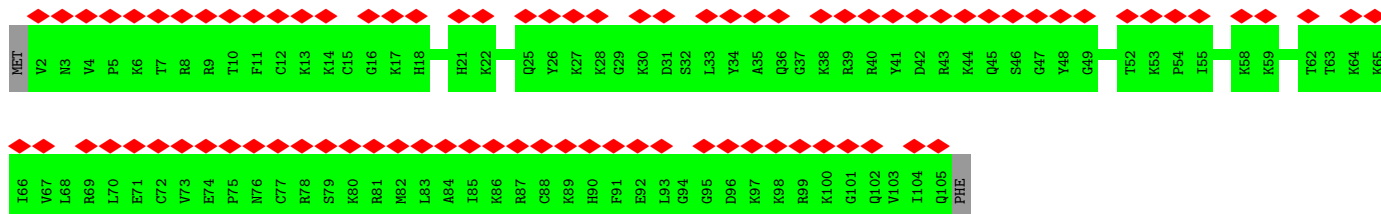
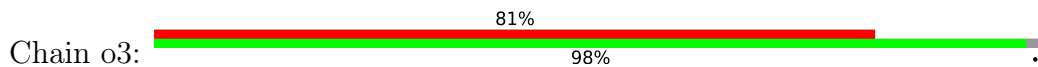
• Molecule 38: eL40



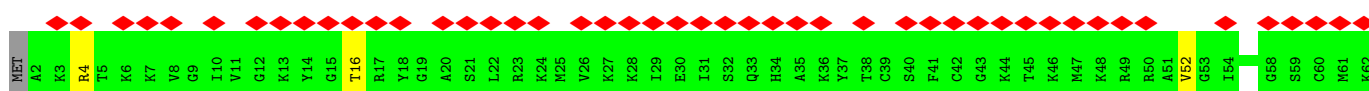
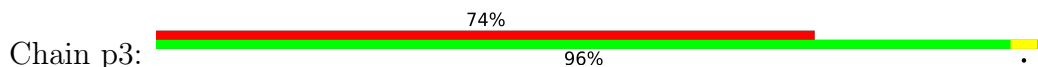
• Molecule 39: 60s ribosomal protein l41

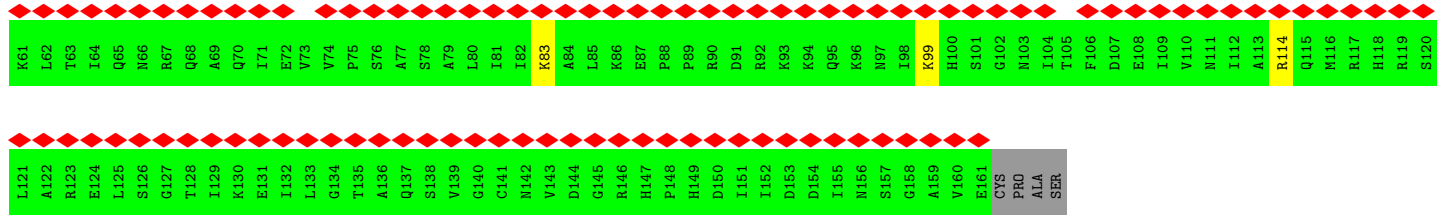


• Molecule 40: eL42

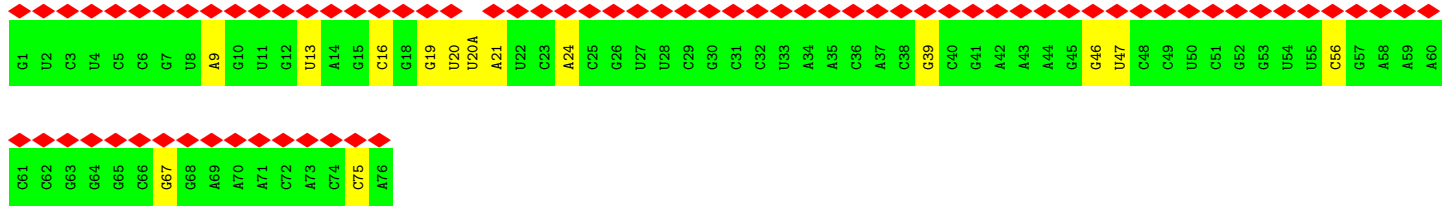
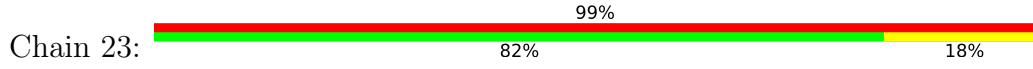


• Molecule 41: eL43

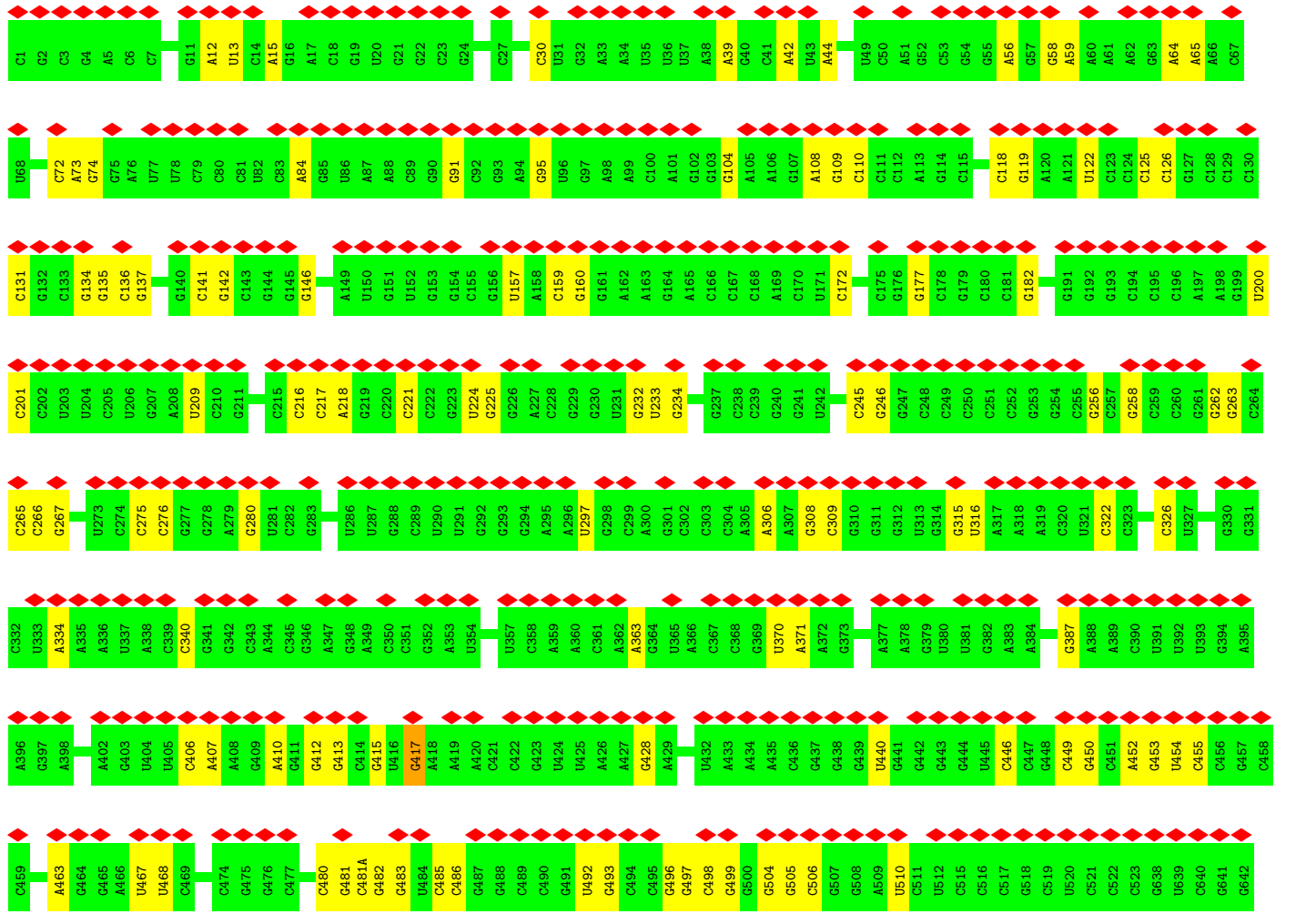
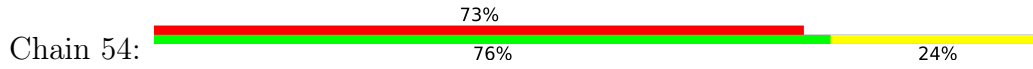


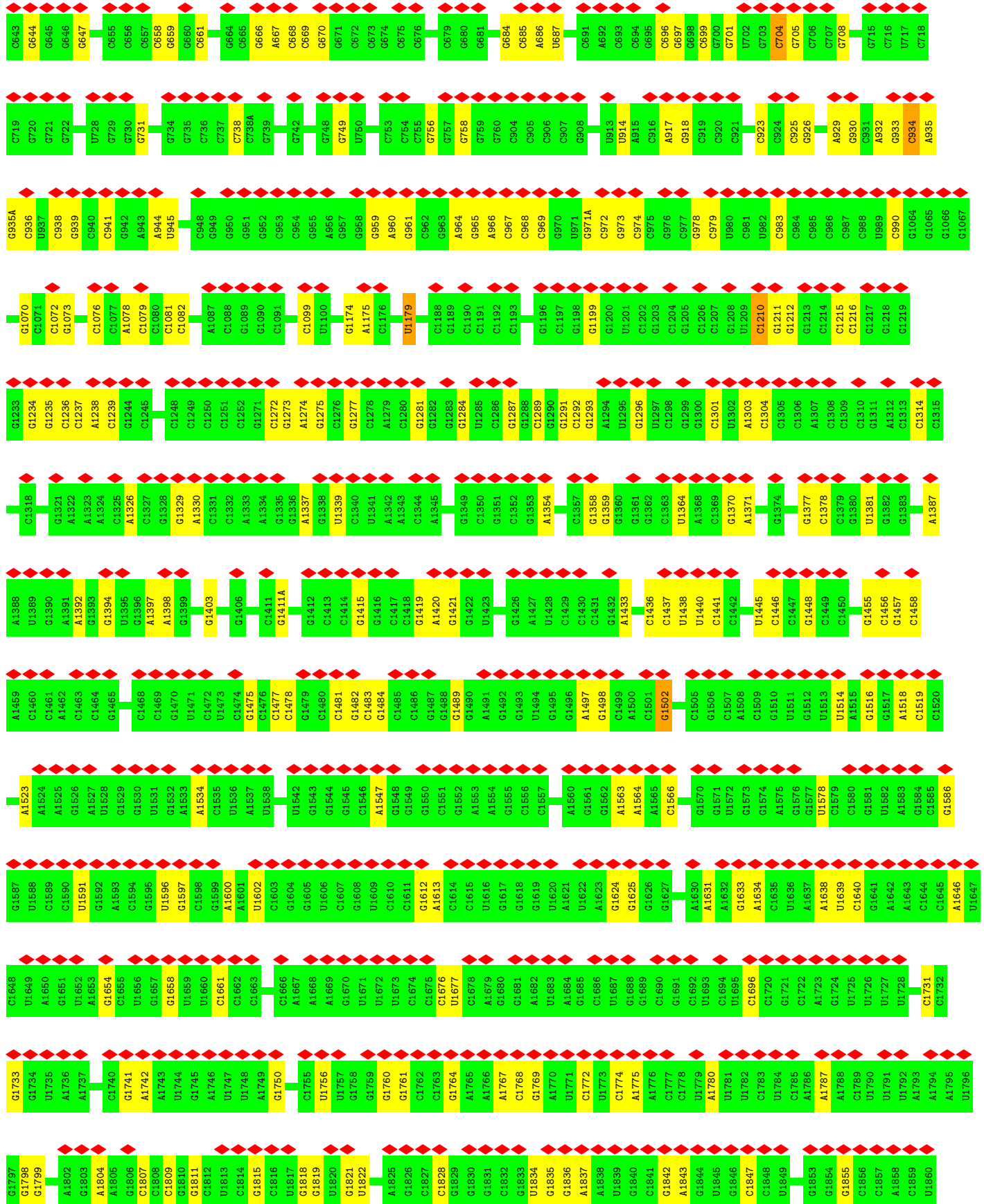


• Molecule 45: P-site tRNA



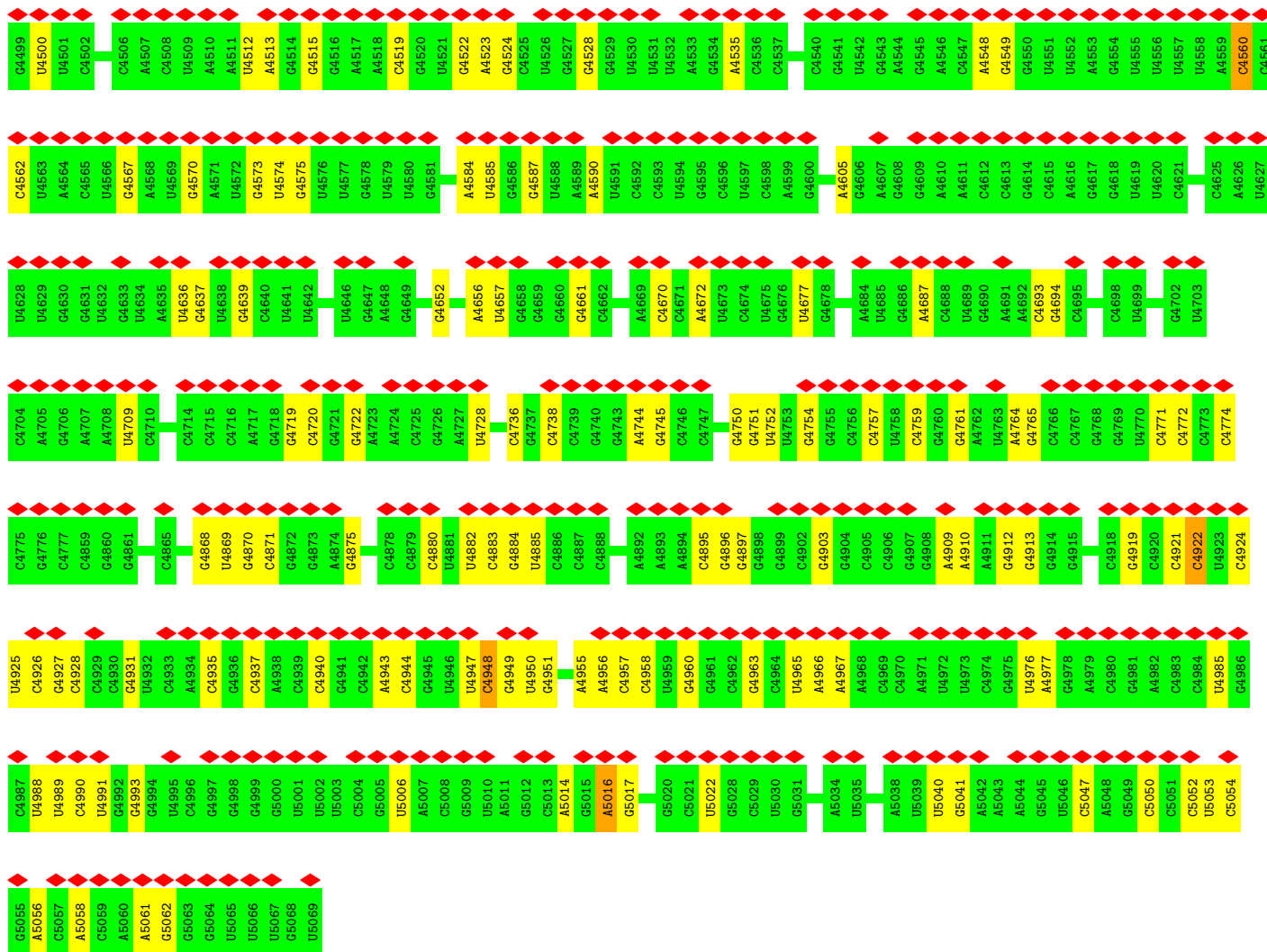
• Molecule 46: 28S ribosomal RNA



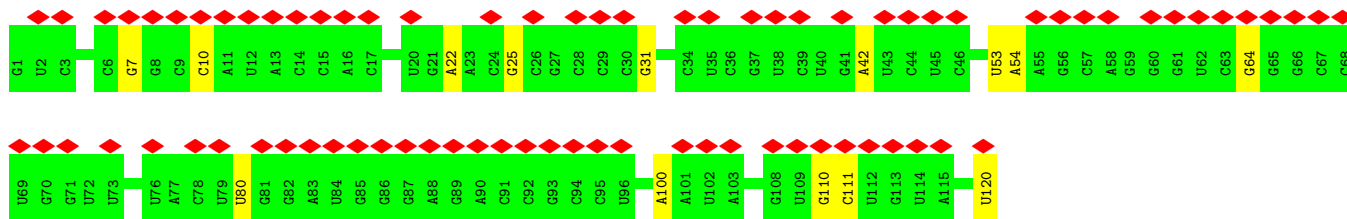
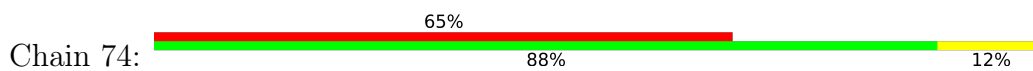


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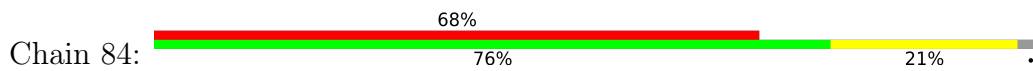
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G4368	G4369	G4370	G4371	G4372	G4373	G4374	G4375	G4376	G4377	G4378	G4379	G4380	U4384	U4385	U4386	U4387	U4388	U4389	U4390	U4391	G4392	U4393	U4394	U4395	U4396	U4397	U4398	U4399	U4400	U4401	U4402	U4403	U4404	G4407	G4408	G4409	G4410	G4411	G4418	U4419	G4420	G4421	G4422	G4423	G4424	G4425	G4426	G4427	G4428	G4429	G4430	G4431	G4432	G4433	G4434	G4435	G4436	G4437	G4438	G4439	G4440	G4441	G4442	G4443	G4444	G4445	G4446	G4447	G4448	G4449	G4450	G4451	G4452	G4453	G4454	G4455	G4456	G4457																																																																																																																																
U4232	U4233	U4234	U4235	U4236	U4237	U4242	U4243	U4244	U4245	U4250	U4251	U4252	U4253	U4254	U4255	U4256	U4257	U4258	U4259	U4260	U4261	U4262	U4263	U4265	U4266	U4267	U4268	U4269	U4270	U4271	U4272	U4273	U4274	U4275	U4281	U4282	U4283	U4284	U4285	U4286	U4287	U4288	U4289	U4290	U4291	U4292	U4293	U4294	U4295	U4296	U4297	U4298	U4299	U4300	U4301	U4302	U4303	U4304	U4305	U4306	U4307	U4308	U4309	U4313	U4314	U4315	U4316	U4317	U4318	U4319	U4320	U4324	U4325	U4328	U4329	U4330	U4331	U4332	U4333	U4334	U4335	U4336	U4337	U4338	U4339	U4340	U4341	U4342	U4343	U4344	U4345	U4346	U4347	U4348	U4349	U4350	U4351	U4352	U4353	U4354	U4355	U4358	U4359	U4360	U4361	U4362	U4363	U4364	U4365	U4366	U4367																																																																																															
C4088	G4089	G4090	G4091	G4092	G4093	G4094	G4095	G4096	G4097	A4098	G4099	C4100	C4101	C4102	C4103	C4104	C4105	C4106	C4107	C4108	C4109	C4110	C4111	C4112	C4113	C4114	C4115	C4116	C4117	C4118	C4119	C4120	C4121	C4122	C4123	C4124	C4125	C4126	A4127	A4128	C4129	C4130	C4131	C4132	C4133	C4134	C4135	C4136	C4137	C4138	C4139	C4140	C4141	C4142	C4143	C4144	C4145	C4146	C4147	C4148	C4149	C4156	C4157	C4158	C4159	C4160	C4161	C4162	C4163	C4164	C4165	C4166																																																																																																																																						
A3908	C3909	C3910	C3911	U3914	U3915	U3916	U3917	U3918	U3919	U3920	U3921	U3922	A3923	U3924	U3925	U3926	U3927	U3928	U3929	U3930	U3931	U3932	U3933	U3934	C3937	U3938	U3939	U3940	U3941	U3942	U3943	G3946	A3947	C3948	G4065	U4066	U4067	U4068	U4069	U4070	U4071	C4072	U4075	U4076	A4077	C4078	C4079	C4080	C4081	C4082	U4083	U4084	U4085	U4086	G4087	A3845																																																																																																																																																						
C3846	C3847	C3850	U3851	C3852	U3853	C3854	C3855	C3856	C3857	C3858	C3859	A3860	C3863	C3864	C3865	C3866	C3867	C3868	C3869	C3870	C3871	C3872	C3873	C3874	C3875	C3876	C3877	C3878	C3879	C3880	C3881	C3882	U3883	U3884	C3885	C3886	C3887	C3888	C3889	A3890	A3891	U3892	C3893	C3894	C3895	C3896	C3897	C3898	C3899	C3900	A3901	A3902	A3903	G3904	A3905	A3906	C3907																																																																																																																																																					
U3786	G3787	C3788	C3789	U3790	C3791	C3792	U3793	C3794	C3795	U3796	C3797	U3798	U3799	A3800	U3801	U3802	A3803	C3804	U3805	C3806	C3807	C3808	C3809	C3810	C3811	C3812	C3813	C3814	G3815	C3816	C3817	C3818	C3819	C3820	A3821	U3822	C3823	A3824	A3825	C3826	C3827	C3828	C3829	C3830	U3831	U3832	C3833	C3834	C3835	C3836	C3837	U3838	G3839	U3840	C3841	C3842	C3843	A3844																																																																																																																																																				
G3725	A3726	A3727	U3728	U3729	U3730	C3731	U3734	G3735	A3736	G3737	G3738	C3739	C3740	C3741	C3742	C3743	C3744	U3745	A3746	A3747	A3748	C3749	C3750	C3751	C3752	C3753	C3754	C3755	A3756	C3757	U3758	A3759	A3760	C3761	U3762	A3763	U3764	C3765	A3766	C3767	U3768	C3769	U3770	C3771	U3772	U3773	A3774	A3775	G3776	C3777	U3778	A3779	C3780	C3781	C3782	A3783	A3784	A3785																																																																																																																																																				
C3605	U3606	U3607	A3608	G3609	A3610	A3611	C3612	U3613	G3614	G3615	U3616	C3617	C3618	G3619	A3620	A3621	C3622	C3623	A3624	G3625	G3626	G3627	G3628	A3629	A3630	U3631	C3632	C3633	G3634	A3635	C3636	U3637	C3638	U3639	U3640	U3641	A3642	A3643	U3644	U3645	A3646	A3647	A3648	A3649	C3650	A3651	A3652	A3653	G3654	C3655	C3656	U3657	C3658	G3659	C3660	G3661	A3662	C3663	G3664																																																																																																																																																			
G3665	C3666	C3667	C3668	C3669	C3670	C3671	C3672	C3673	C3674	C3675	C3676	C3677	C3678	C3679	C3680	U3681	C3682	C3683	C3684	C3685	C3686	A3687	C3688	C3689	U3690	C3691	C3692	C3693	G3694	U3695	C3696	C3697	C3698	C3699	C3700	C3701	A3702	C3703	U3704	C3705	C3706	U3707	C3708	U3709	C3710	A3711	U3712	U3713	C3714	C3715	C3716	U3717	C3718	A3719	C3720	U3721	C3722	A3723	A3724																																																																																																																																																			
C3505	U3506	U3507	A3508	G3509	A3510	A3511	C3512	U3513	G3514	G3515	U3516	C3517	C3518	G3519	A3520	C3521	C3522	C3523	A3524	G3525	G3526	G3527	G3528	A3529	A3530	U3531	C3532	C3533	G3534	U3535	C3536	U3537	C3538	U3539	U3540	U3541	A3542	A3543	U3544	U3545	A3546	A3547	A3548	A3549	C3550	A3551	A3552	A3553	G3554	C3555	C3558	U3559	C3560	G3561	C3562	C3563	G3564																																																																																																																																																					
A2845	G2846	G2847	G2848	G2849	A2850	G2851	U2852	C2853	G2854	G2855	U2859	C2860	C2861	G2862	G2863	A2864	U2865	C2866	C2867	G2868	U2869	A2870	A2871	C2872	U2873	U2874	C2875	G2876	G2877	G2878	U2879	U2880	A2881	A2882	G2883	G2884	A2885	U2886	C2890	U2891	C2892	U2893	A2894	A2895	G2896	C2899	U2900	C2901	G2907	C2908	C2909	C2910	C2911	C2912	C2913	C2914	C2915	C2916	C2917	C2918	C2919	C2920	C2921	C2922	C2923	C2924	C2925	C2926	C2927	C2928	C2929	C2930	C2931	C2932	C2933	C2934	C2935	C2936	C2937	C2938	C2939	C2940	C2941	C2942	C2943	C2944	C2945	C2946	C2947	C2948	C2949	C2950	C2951	C2952	C2953	C2954	C2955	C2956	C2957	C2958	C2959	C2960	C2961	C2962	C2963	C2964	C2965	C2966	C2967	C2968	C2969	C2970	C2971	C2972	C2973	C2974	C2975	C2976	C2977	C2978	C2979	C2980	C2981	C2982	C2983	C2984	C2985	C2986	C2987	C2988	C2989	C2990	C2991	C2992	C2993	C2994	C2995	C2996	C2997	C2998	C2999	C3000	C3001	C3002	C3003	C3004	C3005	C3006	C3007	C3008	C3009	C3010	C3011	C3012	C3013	C3014	C3015	C3016	C3017	C3018	C3019	C3020	C3021	C3022	C3023	C3024	C3025	C3026	C3027	C3028	C3029	C3030	C3031	C3032	C3033	C3034	C3035	C3036	C3037	C3038	C3039	C3040	C3041	C3042	C3043	C3044	C3045	C3046	C3047	C3048	C3049	C3050	C3051	C3052	C3053	C3054	C3055	C3056	C3057	C3058	C3059	C3060	C3061	C3062	C3063	A3604



• Molecule 47: 5S ribosomal RNA



• Molecule 48: 5.8S ribosomal RNA



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	49626	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	48.36	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.694	Depositor
Minimum map value	-0.371	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.018	Depositor
Recommended contour level	0.08	Depositor
Map size (Å)	532.0, 532.0, 532.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.33, 1.33, 1.33	Depositor

5 Model quality i

5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, MG

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A3	0.63	0/1936	0.55	0/2596
2	B3	0.63	0/3240	0.56	0/4339
3	C3	0.61	0/2937	0.56	1/3946 (0.0%)
4	D3	0.60	0/2437	0.49	0/3264
5	E3	0.53	0/1762	0.55	0/2362
6	F3	0.66	0/1911	0.50	0/2549
7	G3	0.51	0/1910	0.50	0/2569
8	H3	0.54	0/1535	0.54	0/2063
9	I3	0.60	0/1702	0.53	1/2272 (0.0%)
10	J3	0.46	0/1385	0.52	0/1852
11	L3	0.54	0/1733	0.50	0/2316
12	M3	0.59	0/1158	0.49	0/1547
13	N3	0.70	0/1746	0.55	0/2338
14	O3	0.66	1/1662 (0.1%)	0.55	0/2222
15	P3	0.63	0/1268	0.55	1/1700 (0.1%)
16	Q3	0.64	0/1538	0.56	0/2054
17	R3	0.51	0/1310	0.52	0/1734
18	S3	0.69	0/1501	0.56	1/2012 (0.0%)
19	T3	0.64	0/1326	0.52	0/1770
20	U3	0.52	0/848	0.55	0/1138
21	V3	0.60	0/993	0.55	0/1332
22	W3	0.61	0/541	0.50	0/720
23	X3	0.54	0/984	0.50	0/1323
24	Y3	0.59	0/1132	0.52	0/1504
25	Z3	0.57	0/1130	0.52	0/1507
26	a3	0.68	0/1191	0.55	0/1590
27	b3	0.45	0/861	0.47	0/1138
28	c3	0.56	0/771	0.52	0/1034
29	d3	0.60	0/903	0.52	0/1216
30	e3	0.64	0/1071	0.57	0/1429
31	f3	0.73	0/895	0.61	0/1198
32	g3	0.59	0/916	0.55	0/1220

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
33	h3	0.52	0/1021	0.48	0/1348
34	i3	0.46	0/841	0.48	0/1112
35	j3	0.70	1/720 (0.1%)	0.56	0/952
36	k3	0.51	0/575	0.53	0/761
37	l3	0.62	0/459	0.55	0/608
38	m3	0.57	0/435	0.59	0/575
39	n3	0.28	0/240	0.43	0/305
40	o3	0.57	0/864	0.51	0/1140
41	p3	0.59	0/718	0.53	0/953
42	r3	0.61	0/1010	0.57	0/1354
43	s3	0.29	0/1530	0.49	0/2064
44	t3	0.27	0/1174	0.52	0/1582
45	23	0.41	0/1805	0.83	1/2809 (0.0%)
46	54	1.24	10/84976 (0.0%)	0.93	64/132520 (0.0%)
47	74	1.24	0/2858	0.87	0/4455
48	84	1.22	0/3581	0.87	0/5577
49	NI	0.31	0/150	0.63	0/209
50	NA	0.28	0/425	0.53	0/572
51	NB	0.28	0/450	0.52	0/612
52	TT	0.30	0/3402	0.46	0/4603
53	1	0.47	0/295	0.57	0/394
All	All	1.02	12/153762 (0.0%)	0.80	69/226359 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
13	N3	0	2

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
46	54	1890	G	N9-C4	-7.84	1.31	1.38
46	54	978	G	N9-C4	-6.37	1.32	1.38
35	j3	50	SER	CA-CB	-6.22	1.43	1.52
46	54	1896	A	N9-C4	-6.03	1.34	1.37
46	54	1337	A	N9-C4	-5.72	1.34	1.37
46	54	2285	A	N9-C4	-5.41	1.34	1.37
14	O3	74	ARG	C-N	-5.37	1.21	1.34
46	54	2638	G	N9-C4	-5.36	1.33	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
46	54	978	G	N3-C4	-5.27	1.31	1.35
46	54	2069	A	N9-C4	-5.21	1.34	1.37
46	54	3872	A	N9-C4	-5.07	1.34	1.37
46	54	1646	A	N9-C4	-5.03	1.34	1.37

All (69) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	54	1890	G	N3-C4-C5	9.26	133.23	128.60
46	54	978	G	N3-C4-C5	8.94	133.07	128.60
46	54	1890	G	N3-C4-N9	-8.64	120.81	126.00
46	54	2638	G	N3-C4-N9	-8.53	120.88	126.00
46	54	2638	G	N3-C4-C5	8.28	132.74	128.60
46	54	4354	U	C2-N1-C1'	8.24	127.59	117.70
9	I3	91	LEU	C-N-CA	-7.46	103.04	121.70
46	54	2694	G	C4-C5-N7	7.40	113.76	110.80
46	54	978	G	C2-N3-C4	-7.33	108.24	111.90
46	54	978	G	N3-C4-N9	-7.05	121.77	126.00
46	54	1639	U	C2-N1-C1'	7.03	126.14	117.70
46	54	4922	C	O5'-P-OP1	-7.03	99.38	105.70
46	54	4303	C	C6-N1-C2	-6.77	117.59	120.30
46	54	217	C	N1-C2-O2	6.67	122.90	118.90
46	54	1502	G	C4-C5-N7	6.30	113.32	110.80
46	54	2638	G	C2-N3-C4	-6.27	108.77	111.90
46	54	4305	G	C8-N9-C4	-6.25	103.90	106.40
46	54	3672	G	N3-C4-C5	6.15	131.68	128.60
46	54	4303	C	N3-C2-O2	-6.08	117.64	121.90
46	54	1210	C	C2-N1-C1'	6.07	125.47	118.80
3	C3	150	LEU	CA-CB-CG	-6.04	101.42	115.30
46	54	1639	U	N3-C2-O2	-6.02	117.98	122.20
46	54	978	G	N3-C2-N2	-5.97	115.72	119.90
46	54	1210	C	N1-C2-O2	5.93	122.46	118.90
46	54	2806	A	O4'-C1'-N9	5.85	112.88	108.20
46	54	3771	C	C5-C6-N1	5.82	123.91	121.00
46	54	4354	U	C5-C6-N1	5.77	125.59	122.70
46	54	4423	U	C2-N1-C1'	5.76	124.62	117.70
46	54	1890	G	C5-N7-C8	-5.69	101.45	104.30
46	54	1639	U	N1-C2-O2	5.66	126.76	122.80
18	S3	16	CYS	C-N-CA	-5.63	107.63	121.70
46	54	2694	G	C5-N7-C8	-5.62	101.49	104.30
46	54	1179	U	C2-N1-C1'	5.61	124.44	117.70
46	54	1381	U	N3-C2-O2	-5.59	118.29	122.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	54	4560	C	N3-C2-O2	-5.57	118.00	121.90
46	54	3672	G	C2-N3-C4	-5.52	109.14	111.90
46	54	4354	U	C6-N1-C1'	-5.52	113.47	121.20
46	54	934	C	N1-C2-O2	5.50	122.20	118.90
46	54	1179	U	N1-C2-O2	5.48	126.64	122.80
46	54	1890	G	C2-N3-C4	-5.48	109.16	111.90
15	P3	91	LEU	CA-CB-CG	5.41	127.74	115.30
46	54	4948	C	C2-N1-C1'	5.41	124.75	118.80
46	54	4880	C	C2-N1-C1'	5.36	124.70	118.80
46	54	1179	U	N3-C2-O2	-5.36	118.45	122.20
46	54	2046	G	P-O3'-C3'	5.30	126.07	119.70
46	54	1277	G	N3-C4-N9	-5.29	122.83	126.00
46	54	217	C	N3-C2-O2	-5.28	118.20	121.90
46	54	3876	A	P-O3'-C3'	5.26	126.01	119.70
46	54	217	C	C2-N1-C1'	5.26	124.58	118.80
46	54	2627	C	N3-C2-O2	-5.24	118.23	121.90
46	54	2471	G	N3-C4-C5	5.21	131.21	128.60
46	54	2638	G	N3-C2-N2	-5.20	116.26	119.90
46	54	3904	G	P-O3'-C3'	5.20	125.94	119.70
46	54	4948	C	N3-C2-O2	-5.17	118.28	121.90
46	54	2695	A	P-O3'-C3'	5.15	125.88	119.70
46	54	1277	G	N3-C4-C5	5.15	131.17	128.60
46	54	1339	U	O5'-P-OP1	-5.14	101.07	105.70
46	54	4354	U	OP2-P-O3'	5.12	116.47	105.20
46	54	417	G	O4'-C1'-N9	5.11	112.29	108.20
46	54	1210	C	N3-C2-O2	-5.11	118.33	121.90
45	23	20	U	C2-N1-C1'	5.07	123.79	117.70
46	54	5016	A	C2-N3-C4	-5.07	108.07	110.60
46	54	2827	G	C4-N9-C1'	5.06	133.08	126.50
46	54	4774	C	C5-C6-N1	5.05	123.53	121.00
46	54	974	C	N3-C2-O2	-5.04	118.37	121.90
46	54	2627	C	N1-C2-O2	5.04	121.92	118.90
46	54	4869	U	C2-N1-C1'	5.03	123.73	117.70
46	54	2553	A	O4'-C1'-N9	5.02	112.22	108.20
46	54	704	C	P-O3'-C3'	5.02	125.72	119.70

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
13	N3	76	PRO	Peptide
13	N3	78	GLY	Peptide

5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A3	246/257 (96%)	218 (89%)	28 (11%)	0	100	100
2	B3	392/403 (97%)	358 (91%)	34 (9%)	0	100	100
3	C3	360/425 (85%)	331 (92%)	29 (8%)	0	100	100
4	D3	291/297 (98%)	265 (91%)	26 (9%)	0	100	100
5	E3	208/291 (72%)	185 (89%)	23 (11%)	0	100	100
6	F3	223/247 (90%)	206 (92%)	17 (8%)	0	100	100
7	G3	229/319 (72%)	212 (93%)	17 (7%)	0	100	100
8	H3	188/192 (98%)	176 (94%)	12 (6%)	0	100	100
9	I3	201/214 (94%)	181 (90%)	20 (10%)	0	100	100
10	J3	168/178 (94%)	155 (92%)	13 (8%)	0	100	100
11	L3	208/211 (99%)	193 (93%)	14 (7%)	1 (0%)	29	63
12	M3	136/218 (62%)	125 (92%)	11 (8%)	0	100	100
13	N3	201/204 (98%)	185 (92%)	16 (8%)	0	100	100
14	O3	197/203 (97%)	185 (94%)	12 (6%)	0	100	100
15	P3	151/184 (82%)	142 (94%)	9 (6%)	0	100	100
16	Q3	185/188 (98%)	170 (92%)	15 (8%)	0	100	100
17	R3	153/196 (78%)	142 (93%)	11 (7%)	0	100	100
18	S3	174/176 (99%)	158 (91%)	15 (9%)	1 (1%)	25	59
19	T3	157/160 (98%)	138 (88%)	18 (12%)	1 (1%)	25	59
20	U3	100/128 (78%)	89 (89%)	11 (11%)	0	100	100
21	V3	129/140 (92%)	119 (92%)	10 (8%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
22	W3	61/157 (39%)	54 (88%)	7 (12%)	0	100	100
23	X3	116/156 (74%)	104 (90%)	12 (10%)	0	100	100
24	Y3	132/145 (91%)	122 (92%)	10 (8%)	0	100	100
25	Z3	133/136 (98%)	122 (92%)	11 (8%)	0	100	100
26	a3	145/148 (98%)	131 (90%)	14 (10%)	0	100	100
27	b3	100/226 (44%)	94 (94%)	6 (6%)	0	100	100
28	c3	96/115 (84%)	91 (95%)	5 (5%)	0	100	100
29	d3	105/125 (84%)	92 (88%)	13 (12%)	0	100	100
30	e3	126/135 (93%)	118 (94%)	7 (6%)	1 (1%)	19	53
31	f3	107/110 (97%)	98 (92%)	9 (8%)	0	100	100
32	g3	112/116 (97%)	106 (95%)	6 (5%)	0	100	100
33	h3	120/123 (98%)	114 (95%)	6 (5%)	0	100	100
34	i3	100/105 (95%)	94 (94%)	6 (6%)	0	100	100
35	j3	84/97 (87%)	80 (95%)	4 (5%)	0	100	100
36	k3	67/70 (96%)	63 (94%)	4 (6%)	0	100	100
37	l3	48/51 (94%)	38 (79%)	10 (21%)	0	100	100
38	m3	50/102 (49%)	46 (92%)	4 (8%)	0	100	100
39	n3	23/25 (92%)	23 (100%)	0	0	100	100
40	o3	102/106 (96%)	90 (88%)	12 (12%)	0	100	100
41	p3	89/92 (97%)	83 (93%)	6 (7%)	0	100	100
42	r3	122/137 (89%)	111 (91%)	11 (9%)	0	100	100
43	s3	194/318 (61%)	167 (86%)	27 (14%)	0	100	100
44	t3	151/165 (92%)	121 (80%)	30 (20%)	0	100	100
49	NI	27/29 (93%)	15 (56%)	11 (41%)	1 (4%)	3	18
50	NA	52/215 (24%)	42 (81%)	10 (19%)	0	100	100
51	NB	56/206 (27%)	50 (89%)	6 (11%)	0	100	100
52	TT	424/440 (96%)	395 (93%)	29 (7%)	0	100	100
53	1	32/64 (50%)	17 (53%)	13 (41%)	2 (6%)	1	8
All	All	7271/8745 (83%)	6614 (91%)	650 (9%)	7 (0%)	54	83

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
53	1	4	ILE
11	L3	64	VAL
18	S3	166	ARG
30	e3	127	ALA
49	NI	20	ALA
19	T3	82	GLY
53	1	5	VAL

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A3	190/199 (96%)	188 (99%)	2 (1%)	73	88
2	B3	342/348 (98%)	340 (99%)	2 (1%)	86	93
3	C3	302/347 (87%)	300 (99%)	2 (1%)	84	93
4	D3	247/250 (99%)	247 (100%)	0	100	100
5	E3	190/251 (76%)	187 (98%)	3 (2%)	62	84
6	F3	196/215 (91%)	196 (100%)	0	100	100
7	G3	200/272 (74%)	200 (100%)	0	100	100
8	H3	169/171 (99%)	169 (100%)	0	100	100
9	I3	175/181 (97%)	175 (100%)	0	100	100
10	J3	143/149 (96%)	143 (100%)	0	100	100
11	L3	175/176 (99%)	173 (99%)	2 (1%)	73	88
12	M3	117/161 (73%)	117 (100%)	0	100	100
13	N3	171/172 (99%)	169 (99%)	2 (1%)	71	87
14	O3	171/173 (99%)	170 (99%)	1 (1%)	86	93
15	P3	134/163 (82%)	134 (100%)	0	100	100
16	Q3	164/164 (100%)	164 (100%)	0	100	100
17	R3	138/175 (79%)	137 (99%)	1 (1%)	84	93
18	S3	157/157 (100%)	155 (99%)	2 (1%)	69	86
19	T3	139/140 (99%)	139 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
20	U3	92/114 (81%)	92 (100%)	0	100	100
21	V3	101/107 (94%)	100 (99%)	1 (1%)	76	89
22	W3	55/126 (44%)	55 (100%)	0	100	100
23	X3	106/134 (79%)	105 (99%)	1 (1%)	78	91
24	Y3	124/135 (92%)	122 (98%)	2 (2%)	62	84
25	Z3	117/118 (99%)	116 (99%)	1 (1%)	78	91
26	a3	119/120 (99%)	118 (99%)	1 (1%)	81	92
27	b3	84/172 (49%)	84 (100%)	0	100	100
28	c3	84/98 (86%)	83 (99%)	1 (1%)	71	87
29	d3	98/110 (89%)	96 (98%)	2 (2%)	55	79
30	e3	114/121 (94%)	113 (99%)	1 (1%)	78	91
31	f3	88/89 (99%)	88 (100%)	0	100	100
32	g3	98/99 (99%)	98 (100%)	0	100	100
33	h3	109/110 (99%)	109 (100%)	0	100	100
34	i3	86/89 (97%)	86 (100%)	0	100	100
35	j3	73/80 (91%)	71 (97%)	2 (3%)	44	73
36	k3	64/65 (98%)	64 (100%)	0	100	100
37	l3	47/48 (98%)	47 (100%)	0	100	100
38	m3	48/90 (53%)	48 (100%)	0	100	100
39	n3	24/24 (100%)	24 (100%)	0	100	100
40	o3	92/94 (98%)	92 (100%)	0	100	100
41	p3	74/75 (99%)	71 (96%)	3 (4%)	30	63
42	r3	108/121 (89%)	108 (100%)	0	100	100
43	s3	164/258 (64%)	161 (98%)	3 (2%)	59	82
44	t3	126/137 (92%)	123 (98%)	3 (2%)	49	75
49	NI	2/2 (100%)	2 (100%)	0	100	100
50	NA	48/183 (26%)	48 (100%)	0	100	100
51	NB	51/165 (31%)	51 (100%)	0	100	100
52	TT	370/381 (97%)	367 (99%)	3 (1%)	81	92
53	1	32/53 (60%)	26 (81%)	6 (19%)	1	7
All	All	6318/7382 (86%)	6271 (99%)	47 (1%)	84	93

All (47) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A3	32	VAL
1	A3	64	ARG
2	B3	261	ARG
2	B3	297	LYS
3	C3	95	MET
3	C3	188	ARG
5	E3	58	ARG
5	E3	289	LEU
5	E3	291	PHE
11	L3	10	LEU
11	L3	70	VAL
13	N3	26	ARG
13	N3	80	THR
14	O3	36	VAL
17	R3	71	ARG
18	S3	67	VAL
18	S3	90	THR
21	V3	48	ARG
23	X3	120	ASP
24	Y3	2	LYS
24	Y3	79	VAL
25	Z3	11	VAL
26	a3	122	VAL
28	c3	17	ARG
29	d3	22	THR
29	d3	86	VAL
30	e3	48	ARG
35	j3	67	LEU
35	j3	82	THR
41	p3	4	ARG
41	p3	16	THR
41	p3	52	VAL
43	s3	50	LYS
43	s3	157	ASP
43	s3	166	LYS
44	t3	83	LYS
44	t3	99	LYS
44	t3	114	ARG
52	TT	185	LYS
52	TT	204	ASP
52	TT	277	LEU
53	1	1	MET

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Mol	Chain	Res	Type
53	1	2	ARG
53	1	3	GLU
53	1	6	HIS
53	1	8	GLN
53	1	49	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (96) such sidechains are listed below:

Mol	Chain	Res	Type
1	A3	194	ASN
2	B3	3	HIS
2	B3	315	ASN
2	B3	354	GLN
3	C3	119	GLN
3	C3	198	ASN
3	C3	215	ASN
4	D3	131	ASN
4	D3	175	HIS
5	E3	45	HIS
5	E3	193	HIS
5	E3	214	HIS
5	E3	253	GLN
5	E3	287	HIS
6	F3	57	HIS
6	F3	79	ASN
6	F3	199	HIS
7	G3	91	ASN
7	G3	99	GLN
7	G3	138	GLN
7	G3	147	GLN
7	G3	194	ASN
7	G3	206	GLN
7	G3	248	HIS
9	I3	59	GLN
9	I3	73	ASN
10	J3	42	GLN
10	J3	97	ASN
10	J3	104	ASN
11	L3	111	GLN
11	L3	113	ASN
11	L3	115	GLN
11	L3	149	GLN

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Mol	Chain	Res	Type
11	L3	188	ASN
12	M3	20	HIS
13	N3	37	HIS
13	N3	87	HIS
13	N3	99	GLN
13	N3	196	ASN
13	N3	199	GLN
14	O3	63	ASN
14	O3	180	GLN
14	O3	184	ASN
15	P3	25	HIS
15	P3	56	GLN
15	P3	116	HIS
15	P3	118	GLN
15	P3	120	ASN
16	Q3	8	ASN
16	Q3	44	ASN
16	Q3	57	ASN
16	Q3	160	HIS
17	R3	7	GLN
17	R3	39	GLN
17	R3	58	HIS
17	R3	86	ASN
17	R3	130	ASN
18	S3	37	HIS
18	S3	91	HIS
18	S3	92	ASN
18	S3	125	GLN
18	S3	163	HIS
19	T3	95	HIS
19	T3	114	GLN
20	U3	105	ASN
22	W3	50	ASN
23	X3	93	ASN
23	X3	105	ASN
26	a3	120	GLN
27	b3	49	HIS
27	b3	50	ASN
27	b3	61	ASN
27	b3	101	HIS
29	d3	116	ASN
30	e3	52	GLN

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Mol	Chain	Res	Type
32	g3	114	GLN
33	h3	63	GLN
33	h3	108	GLN
34	i3	26	HIS
34	i3	36	HIS
35	j3	28	HIS
35	j3	76	HIS
37	l3	25	GLN
42	r3	45	HIS
42	r3	103	HIS
43	s3	42	GLN
43	s3	58	ASN
43	s3	72	ASN
52	TT	128	ASN
52	TT	157	GLN
52	TT	197	GLN
52	TT	209	HIS
52	TT	276	HIS
52	TT	278	ASN
52	TT	443	HIS
53	1	8	GLN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
45	23	74/76 (97%)	13 (17%)	0
46	54	3516/3543 (99%)	822 (23%)	58 (1%)
47	74	119/120 (99%)	14 (11%)	0
48	84	149/156 (95%)	32 (21%)	1 (0%)
All	All	3858/3895 (99%)	881 (22%)	59 (1%)

All (881) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
45	23	9	A
45	23	13	U
45	23	16	C
45	23	19	G
45	23	20(A)	U
45	23	21	A
45	23	24	A

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Mol	Chain	Res	Type
45	23	39	G
45	23	46	G
45	23	47	U
45	23	56	C
45	23	67	G
45	23	75	C
46	54	12	A
46	54	13	U
46	54	15	A
46	54	30	C
46	54	39	A
46	54	42	A
46	54	44	A
46	54	56	A
46	54	58	G
46	54	59	A
46	54	64	A
46	54	65	A
46	54	72	C
46	54	73	A
46	54	74	G
46	54	84	A
46	54	91	G
46	54	95	G
46	54	104	G
46	54	108	A
46	54	109	G
46	54	110	C
46	54	118	C
46	54	119	G
46	54	122	U
46	54	126	C
46	54	131	C
46	54	134	G
46	54	135	G
46	54	136	C
46	54	137	G
46	54	141	C
46	54	142	G
46	54	146	G
46	54	157	U
46	54	159	C

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Mol	Chain	Res	Type
46	54	160	G
46	54	172	C
46	54	177	G
46	54	182	G
46	54	200	U
46	54	201	C
46	54	209	U
46	54	216	C
46	54	218	A
46	54	221	C
46	54	224	U
46	54	225	G
46	54	232	G
46	54	233	U
46	54	234	G
46	54	246	G
46	54	256	G
46	54	258	G
46	54	262	G
46	54	263	G
46	54	265	C
46	54	266	C
46	54	267	G
46	54	276	C
46	54	280	G
46	54	297	U
46	54	306	A
46	54	308	G
46	54	309	C
46	54	315	G
46	54	316	U
46	54	322	C
46	54	326	C
46	54	334	A
46	54	340	C
46	54	363	A
46	54	370	U
46	54	371	A
46	54	387	G
46	54	407	A
46	54	410	A
46	54	412	G

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Mol	Chain	Res	Type
46	54	413	G
46	54	415	G
46	54	417	G
46	54	428	G
46	54	440	U
46	54	446	C
46	54	449	C
46	54	450	G
46	54	452	A
46	54	453	G
46	54	454	U
46	54	455	C
46	54	463	A
46	54	467	U
46	54	468	U
46	54	481	G
46	54	481(A)	C
46	54	482	G
46	54	483	G
46	54	485	C
46	54	486	C
46	54	492	U
46	54	493	G
46	54	496	G
46	54	497	G
46	54	498	C
46	54	499	G
46	54	505	G
46	54	506	C
46	54	510	U
46	54	644	G
46	54	647	G
46	54	658	C
46	54	659	G
46	54	661	C
46	54	666	G
46	54	667	A
46	54	668	C
46	54	669	C
46	54	670	G
46	54	685	C
46	54	686	A

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Mol	Chain	Res	Type
46	54	687	U
46	54	696	C
46	54	697	G
46	54	699	C
46	54	701	G
46	54	704	C
46	54	705	G
46	54	708	G
46	54	731	G
46	54	738	C
46	54	749	G
46	54	756	G
46	54	758	G
46	54	914	U
46	54	917	A
46	54	918	G
46	54	923	C
46	54	925	C
46	54	926	G
46	54	929	A
46	54	930	G
46	54	932	A
46	54	933	G
46	54	934	C
46	54	935	A
46	54	935(A)	G
46	54	936	C
46	54	938	C
46	54	939	G
46	54	941	C
46	54	944	A
46	54	945	U
46	54	959	G
46	54	960	A
46	54	961	G
46	54	964	A
46	54	965	G
46	54	966	A
46	54	967	C
46	54	968	C
46	54	969	C
46	54	971(A)	G

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Mol	Chain	Res	Type
46	54	972	C
46	54	973	G
46	54	979	C
46	54	983	C
46	54	990	C
46	54	1070	G
46	54	1072	C
46	54	1073	G
46	54	1076	C
46	54	1078	A
46	54	1079	C
46	54	1081	C
46	54	1082	C
46	54	1099	C
46	54	1175	A
46	54	1179	U
46	54	1199	G
46	54	1210	C
46	54	1211	G
46	54	1212	G
46	54	1215	C
46	54	1216	C
46	54	1234	G
46	54	1235	G
46	54	1236	C
46	54	1237	C
46	54	1238	A
46	54	1239	C
46	54	1272	C
46	54	1273	G
46	54	1274	A
46	54	1275	G
46	54	1281	G
46	54	1284	G
46	54	1287	G
46	54	1289	C
46	54	1291	G
46	54	1292	C
46	54	1293	G
46	54	1296	G
46	54	1301	C
46	54	1303	A

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Mol	Chain	Res	Type
46	54	1304	C
46	54	1314	C
46	54	1326	A
46	54	1330	A
46	54	1354	A
46	54	1358	G
46	54	1359	G
46	54	1364	U
46	54	1370	G
46	54	1371	A
46	54	1377	G
46	54	1378	C
46	54	1387	A
46	54	1392	A
46	54	1394	G
46	54	1397	A
46	54	1398	A
46	54	1403	G
46	54	1411(A)	G
46	54	1415	G
46	54	1419	G
46	54	1420	A
46	54	1421	G
46	54	1433	A
46	54	1436	C
46	54	1437	C
46	54	1438	U
46	54	1440	U
46	54	1441	C
46	54	1445	U
46	54	1446	C
46	54	1448	G
46	54	1456	C
46	54	1457	G
46	54	1458	C
46	54	1475	G
46	54	1478	C
46	54	1481	C
46	54	1482	G
46	54	1483	C
46	54	1484	G
46	54	1489	G

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Mol	Chain	Res	Type
46	54	1497	A
46	54	1498	G
46	54	1502	G
46	54	1514	U
46	54	1516	G
46	54	1518	A
46	54	1519	C
46	54	1523	A
46	54	1534	A
46	54	1547	A
46	54	1563	A
46	54	1564	A
46	54	1566	C
46	54	1578	U
46	54	1586	G
46	54	1591	U
46	54	1596	U
46	54	1597	G
46	54	1600	A
46	54	1602	U
46	54	1612	G
46	54	1613	A
46	54	1624	G
46	54	1625	G
46	54	1631	A
46	54	1633	G
46	54	1634	A
46	54	1638	A
46	54	1640	C
46	54	1654	G
46	54	1658	G
46	54	1661	C
46	54	1676	C
46	54	1677	U
46	54	1696	C
46	54	1731	C
46	54	1733	G
46	54	1741	G
46	54	1742	A
46	54	1750	G
46	54	1756	U
46	54	1760	G

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Mol	Chain	Res	Type
46	54	1761	G
46	54	1764	G
46	54	1767	A
46	54	1768	C
46	54	1769	G
46	54	1772	C
46	54	1774	C
46	54	1775	A
46	54	1780	A
46	54	1787	A
46	54	1798	G
46	54	1799	G
46	54	1804	A
46	54	1807	C
46	54	1809	C
46	54	1811	G
46	54	1815	G
46	54	1818	G
46	54	1819	G
46	54	1821	G
46	54	1822	U
46	54	1828	C
46	54	1834	U
46	54	1835	G
46	54	1836	G
46	54	1837	A
46	54	1842	G
46	54	1843	A
46	54	1847	C
46	54	1855	G
46	54	1869	G
46	54	1882	U
46	54	1889	U
46	54	1892	A
46	54	1897	A
46	54	1898	C
46	54	1916	G
46	54	1918	U
46	54	1920	C
46	54	1921	C
46	54	1922	G
46	54	1931	C

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Mol	Chain	Res	Type
46	54	1932	A
46	54	1935	C
46	54	1940	G
46	54	1945	G
46	54	1947	U
46	54	1948	G
46	54	1957	U
46	54	1958	A
46	54	1960	A
46	54	1961	G
46	54	1962	A
46	54	1963	C
46	54	1964	A
46	54	1965	G
46	54	1968	G
46	54	1969	G
46	54	1971	U
46	54	1974	U
46	54	1975	G
46	54	1976	G
46	54	1978	C
46	54	1979	A
46	54	1980	U
46	54	1984	A
46	54	1987	C
46	54	1988	G
46	54	1990	A
46	54	1991	A
46	54	1997	U
46	54	1999	A
46	54	2001	G
46	54	2002	A
46	54	2003	G
46	54	2004	U
46	54	2008	U
46	54	2011	C
46	54	2018	C
46	54	2020	U
46	54	2021	G
46	54	2022	C
46	54	2024	G
46	54	2026	A

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Mol	Chain	Res	Type
46	54	2043	A
46	54	2046	G
46	54	2047	A
46	54	2048	U
46	54	2052	G
46	54	2053	C
46	54	2055	G
46	54	2056	G
46	54	2063	G
46	54	2064	G
46	54	2069	A
46	54	2071	A
46	54	2084	U
46	54	2090	U
46	54	2092	G
46	54	2093	G
46	54	2094	C
46	54	2095	A
46	54	2097	A
46	54	2098	G
46	54	2099	C
46	54	2100	G
46	54	2101	A
46	54	2102	G
46	54	2104	A
46	54	2105	A
46	54	2107	A
46	54	2108	G
46	54	2110	G
46	54	2259	G
46	54	2260	C
46	54	2267	U
46	54	2268	A
46	54	2269	C
46	54	2275	G
46	54	2277	C
46	54	2279	A
46	54	2289	C
46	54	2294	G
46	54	2299	G
46	54	2300	A
46	54	2301	G

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Mol	Chain	Res	Type
46	54	2306	G
46	54	2313	A
46	54	2314	G
46	54	2316	G
46	54	2331	G
46	54	2333	G
46	54	2335	C
46	54	2348	G
46	54	2351	C
46	54	2364	G
46	54	2382	A
46	54	2395	A
46	54	2396	A
46	54	2398	U
46	54	2408	U
46	54	2409	U
46	54	2417	A
46	54	2422	C
46	54	2424	G
46	54	2425	U
46	54	2430	C
46	54	2431	A
46	54	2433	G
46	54	2441	C
46	54	2447	U
46	54	2450	G
46	54	2453	A
46	54	2469	C
46	54	2475	G
46	54	2476	G
46	54	2487	G
46	54	2488	C
46	54	2489	C
46	54	2490	U
46	54	2491	C
46	54	2492	C
46	54	2498	C
46	54	2503	G
46	54	2504	C
46	54	2505	C
46	54	2506	G
46	54	2511	A

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Mol	Chain	Res	Type
46	54	2512	A
46	54	2513	A
46	54	2527	A
46	54	2529	A
46	54	2530	U
46	54	2536	A
46	54	2537	A
46	54	2546	G
46	54	2547	G
46	54	2553	A
46	54	2554	U
46	54	2566	G
46	54	2568	C
46	54	2570	U
46	54	2575	U
46	54	2583	C
46	54	2586	G
46	54	2587	A
46	54	2588	C
46	54	2599	G
46	54	2600	A
46	54	2602	G
46	54	2618	G
46	54	2620	G
46	54	2621	A
46	54	2627	C
46	54	2638	G
46	54	2653	C
46	54	2662	G
46	54	2669	C
46	54	2673	G
46	54	2674	A
46	54	2676	A
46	54	2677	G
46	54	2686	G
46	54	2687	U
46	54	2695	A
46	54	2696	A
46	54	2705	G
46	54	2707	U
46	54	2708	U
46	54	2709	C

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Mol	Chain	Res	Type
46	54	2711	G
46	54	2714	G
46	54	2721	G
46	54	2725	A
46	54	2726	G
46	54	2740	U
46	54	2743	A
46	54	2760	G
46	54	2761	U
46	54	2763	U
46	54	2764	A
46	54	2769	U
46	54	2772	C
46	54	2787	A
46	54	2788	U
46	54	2790	U
46	54	2794	C
46	54	2798	A
46	54	2803	U
46	54	2807	A
46	54	2808	G
46	54	2822	G
46	54	2826	U
46	54	2827	G
46	54	2828	U
46	54	2834	C
46	54	2842	G
46	54	2850	A
46	54	2855	G
46	54	2867	C
46	54	2875	C
46	54	2879	A
46	54	2895	A
46	54	3598	C
46	54	3603	G
46	54	3604	A
46	54	3605	C
46	54	3616	U
46	54	3617	G
46	54	3618	C
46	54	3622	C
46	54	3625	G

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Mol	Chain	Res	Type
46	54	3626	G
46	54	3630	A
46	54	3635	A
46	54	3644	U
46	54	3646	A
46	54	3648	A
46	54	3649	A
46	54	3657	U
46	54	3662	A
46	54	3664	G
46	54	3672	G
46	54	3673	C
46	54	3674	G
46	54	3682	A
46	54	3692	A
46	54	3702	A
46	54	3711	A
46	54	3714	G
46	54	3728	A
46	54	3729	U
46	54	3743	G
46	54	3748	A
46	54	3750	G
46	54	3753	G
46	54	3756	A
46	54	3760	A
46	54	3763	A
46	54	3767	C
46	54	3772	U
46	54	3773	U
46	54	3776	G
46	54	3777	G
46	54	3780	G
46	54	3783	A
46	54	3784	A
46	54	3786	U
46	54	3787	G
46	54	3809	G
46	54	3810	C
46	54	3811	G
46	54	3814	U
46	54	3817	A

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Mol	Chain	Res	Type
46	54	3819	G
46	54	3822	U
46	54	3824	A
46	54	3838	U
46	54	3840	U
46	54	3876	A
46	54	3877	A
46	54	3878	C
46	54	3879	G
46	54	3880	G
46	54	3889	G
46	54	3897	G
46	54	3901	A
46	54	3905	A
46	54	3906	A
46	54	3907	G
46	54	3908	A
46	54	3915	U
46	54	3916	G
46	54	3917	A
46	54	3923	A
46	54	3926	C
46	54	3938	G
46	54	3939	G
46	54	3943	A
46	54	3946	G
46	54	4066	U
46	54	4069	U
46	54	4070	U
46	54	4076	G
46	54	4084	G
46	54	4086	G
46	54	4088	C
46	54	4097	G
46	54	4111	U
46	54	4116	C
46	54	4118	U
46	54	4119	C
46	54	4120	U
46	54	4121	G
46	54	4127	A
46	54	4128	A

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Mol	Chain	Res	Type
46	54	4133	C
46	54	4136	G
46	54	4158	C
46	54	4162	C
46	54	4163	U
46	54	4166	G
46	54	4170	A
46	54	4171	C
46	54	4183	G
46	54	4184	G
46	54	4191	G
46	54	4203	A
46	54	4212	A
46	54	4215	C
46	54	4225	G
46	54	4229	U
46	54	4233	A
46	54	4237	C
46	54	4251	A
46	54	4254	G
46	54	4265	U
46	54	4266	G
46	54	4267	G
46	54	4268	A
46	54	4271	A
46	54	4273	A
46	54	4281	A
46	54	4282	A
46	54	4291	G
46	54	4297	G
46	54	4304	A
46	54	4305	G
46	54	4306	U
46	54	4314	C
46	54	4317	A
46	54	4324	A
46	54	4329	G
46	54	4330	G
46	54	4332	C
46	54	4339	A
46	54	4349	C
46	54	4354	U

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Mol	Chain	Res	Type
46	54	4355	G
46	54	4364	G
46	54	4373	G
46	54	4377	G
46	54	4378	A
46	54	4379	A
46	54	4380	A
46	54	4387	C
46	54	4391	G
46	54	4393	G
46	54	4394	A
46	54	4395	U
46	54	4398	C
46	54	4401	G
46	54	4419	U
46	54	4421	C
46	54	4422	A
46	54	4430	G
46	54	4437	U
46	54	4438	U
46	54	4444	C
46	54	4448	G
46	54	4449	A
46	54	4452	U
46	54	4453	C
46	54	4464	A
46	54	4466	C
46	54	4471	U
46	54	4472	G
46	54	4473	A
46	54	4475	G
46	54	4488	A
46	54	4489	G
46	54	4500	U
46	54	4512	U
46	54	4513	A
46	54	4515	G
46	54	4519	C
46	54	4522	G
46	54	4523	A
46	54	4524	G
46	54	4528	G

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Mol	Chain	Res	Type
46	54	4535	A
46	54	4548	A
46	54	4549	G
46	54	4560	C
46	54	4562	C
46	54	4567	G
46	54	4570	G
46	54	4573	G
46	54	4574	U
46	54	4575	G
46	54	4584	A
46	54	4585	U
46	54	4587	G
46	54	4590	A
46	54	4605	A
46	54	4636	U
46	54	4637	G
46	54	4639	G
46	54	4652	G
46	54	4656	A
46	54	4657	U
46	54	4661	G
46	54	4670	C
46	54	4672	A
46	54	4677	U
46	54	4687	A
46	54	4693	C
46	54	4694	G
46	54	4709	U
46	54	4719	G
46	54	4720	C
46	54	4722	G
46	54	4728	U
46	54	4736	C
46	54	4738	C
46	54	4744	A
46	54	4745	G
46	54	4750	G
46	54	4751	G
46	54	4752	U
46	54	4754	G
46	54	4757	C

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Mol	Chain	Res	Type
46	54	4759	C
46	54	4761	G
46	54	4764	A
46	54	4765	G
46	54	4771	C
46	54	4772	C
46	54	4868	G
46	54	4870	G
46	54	4871	C
46	54	4875	G
46	54	4882	U
46	54	4883	C
46	54	4885	U
46	54	4895	C
46	54	4896	G
46	54	4897	G
46	54	4903	G
46	54	4909	A
46	54	4910	A
46	54	4912	G
46	54	4913	G
46	54	4919	G
46	54	4921	C
46	54	4922	C
46	54	4924	C
46	54	4925	U
46	54	4926	C
46	54	4927	G
46	54	4928	C
46	54	4931	G
46	54	4935	C
46	54	4937	C
46	54	4940	C
46	54	4943	A
46	54	4944	C
46	54	4948	C
46	54	4949	G
46	54	4950	U
46	54	4951	G
46	54	4955	A
46	54	4956	A
46	54	4957	C

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Mol	Chain	Res	Type
46	54	4958	C
46	54	4960	G
46	54	4963	G
46	54	4965	U
46	54	4966	A
46	54	4967	A
46	54	4976	U
46	54	4977	A
46	54	4985	U
46	54	4988	U
46	54	4989	U
46	54	4990	C
46	54	4991	U
46	54	4993	G
46	54	5006	U
46	54	5014	A
46	54	5016	A
46	54	5017	G
46	54	5022	U
46	54	5040	U
46	54	5041	G
46	54	5047	C
46	54	5050	C
46	54	5052	C
46	54	5053	U
46	54	5054	C
46	54	5056	A
46	54	5058	A
46	54	5061	A
46	54	5062	G
47	74	7	G
47	74	10	C
47	74	22	A
47	74	25	G
47	74	31	G
47	74	42	A
47	74	53	U
47	74	54	A
47	74	64	G
47	74	80	U
47	74	100	A
47	74	110	G

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Mol	Chain	Res	Type
47	74	111	C
47	74	120	U
48	84	2	G
48	84	3	A
48	84	13	G
48	84	20	A
48	84	23	C
48	84	32	C
48	84	34	U
48	84	35	C
48	84	38	U
48	84	49	G
48	84	59	A
48	84	62	A
48	84	63	U
48	84	75	G
48	84	79	G
48	84	86	U
48	84	87	G
48	84	103	A
48	84	105	C
48	84	106	G
48	84	109	C
48	84	110	U
48	84	111	U
48	84	112	G
48	84	114	G
48	84	123	U
48	84	125	C
48	84	126	C
48	84	127	U
48	84	128	C
48	84	153	C
48	84	156	U

All (59) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
46	54	12	A
46	54	125	C
46	54	134	G
46	54	245	C

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Mol	Chain	Res	Type
46	54	265	C
46	54	275	C
46	54	406	C
46	54	449	C
46	54	480	C
46	54	485	C
46	54	498	C
46	54	504	G
46	54	684	G
46	54	685	C
46	54	696	C
46	54	704	C
46	54	935(A)	G
46	54	959	G
46	54	971(A)	G
46	54	1072	C
46	54	1174	G
46	54	1211	G
46	54	1236	C
46	54	1238	A
46	54	1329	G
46	54	1370	G
46	54	1440	U
46	54	1445	U
46	54	1455	G
46	54	1477	C
46	54	1482	G
46	54	1633	G
46	54	1818	G
46	54	2046	G
46	54	2089	G
46	54	2266	C
46	54	2468	U
46	54	2488	C
46	54	2502	A
46	54	2546	G
46	54	2695	A
46	54	3603	G
46	54	3625	G
46	54	3876	A
46	54	3888	G
46	54	3904	G

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Mol	Chain	Res	Type
46	54	4119	C
46	54	4170	A
46	54	4232	U
46	54	4354	U
46	54	4378	A
46	54	4448	G
46	54	4719	G
46	54	4884	G
46	54	4921	C
46	54	4925	U
46	54	4947	U
46	54	4989	U
48	84	124	U

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 225 ligands modelled in this entry, 225 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

The following chains have linkage breaks:

Mol	Chain	Number of breaks
46	54	27
45	23	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	54	2113:G	O3'	2258:C	P	40.63
1	54	1252:C	O3'	1271:G	P	37.10
1	54	1219:G	O3'	1233:G	P	19.39
1	54	3948:C	O3'	4065:G	P	18.92
1	54	4138:C	O3'	4146:G	P	18.16
1	54	990:C	O3'	1064:G	P	17.76
1	54	1696:C	O3'	1720:C	P	16.65
1	54	523:C	O3'	638:G	P	16.27
1	54	5022:U	O3'	5028:G	P	16.12
1	54	4777:C	O3'	4859:C	P	16.01
1	54	1406(C):G	O3'	1411:C	P	15.31
1	54	4101:C	O3'	4107:G	P	15.18
1	54	1364:U	O3'	1368:A	P	13.95
1	54	760:G	O3'	904:C	P	13.79
1	54	2901:G	O3'	3597:G	P	12.37
1	54	182:G	O3'	189:G	P	12.34
1	54	1180:C	O3'	1183:C	P	9.50
1	54	4729:A	O3'	4735:G	P	9.38
1	54	1100:U	O3'	1168:G	P	8.14
1	54	512:U	O3'	515:C	P	7.49
1	54	500:G	O3'	504:G	P	6.25
1	23	16:C	O3'	18:G	P	5.32
1	54	4740:G	O3'	4743:G	P	5.30
1	54	170:C	O3'	171:U	P	4.95
1	54	1239:C	O3'	1244:G	P	4.92
1	54	5020:G	O3'	5021:C	P	3.70
1	54	4899:G	O3'	4902:C	P	3.31
1	54	751:G	O3'	752:G	P	3.15

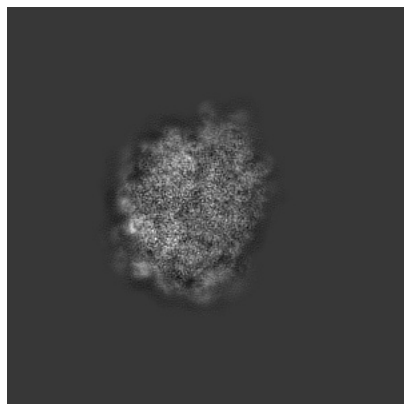
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-10380. These allow visual inspection of the internal detail of the map and identification of artifacts.

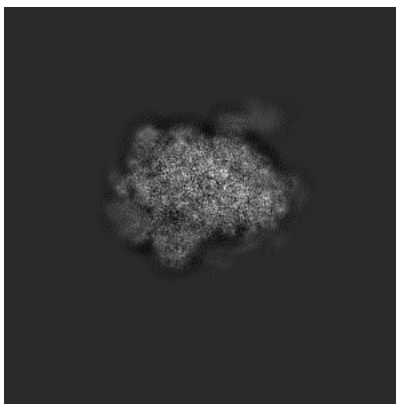
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

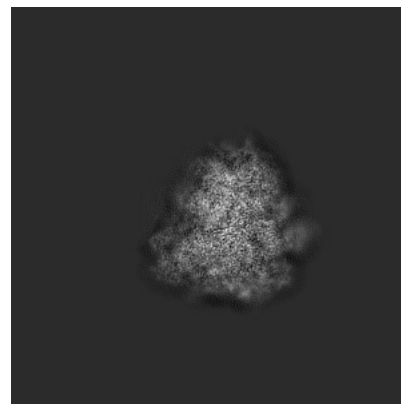
6.1.1 Primary map



X

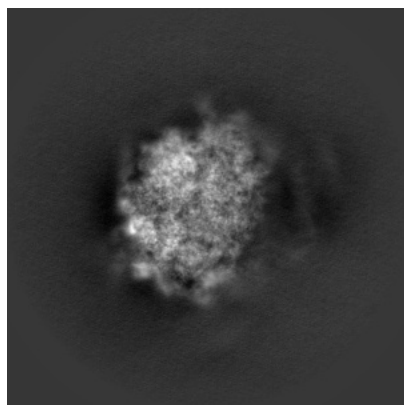


Y

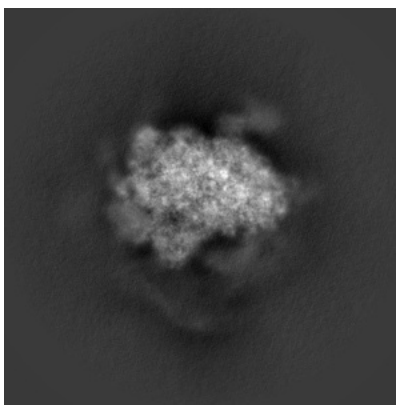


Z

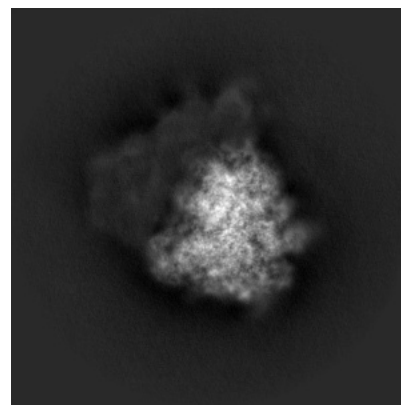
6.1.2 Raw map



X



Y

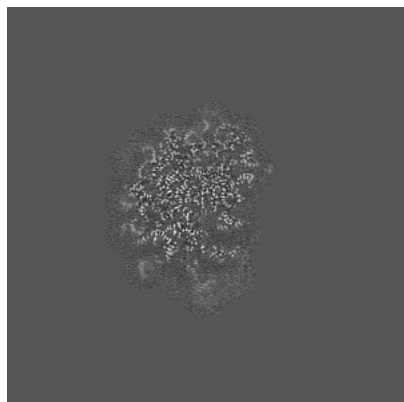


Z

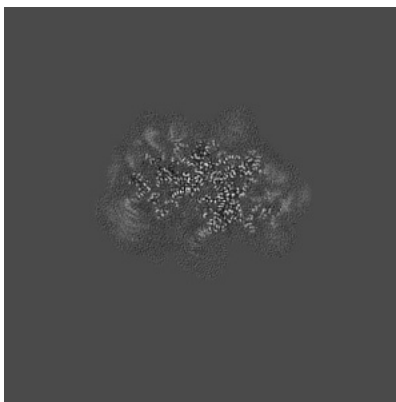
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

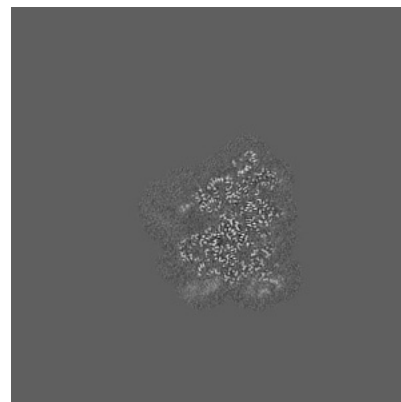
6.2.1 Primary map



X Index: 200

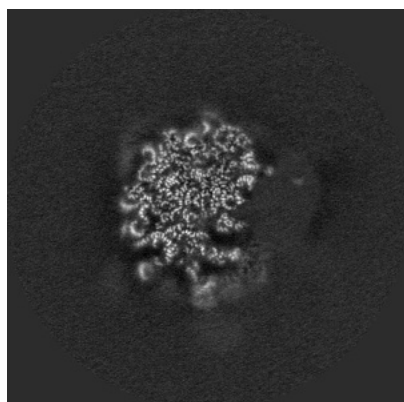


Y Index: 200

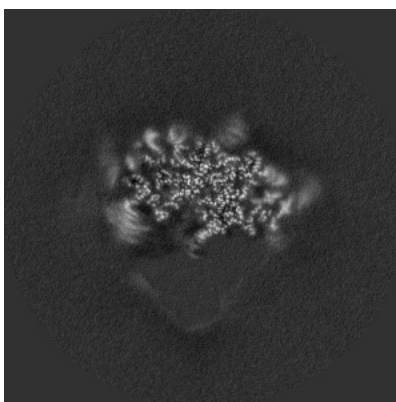


Z Index: 200

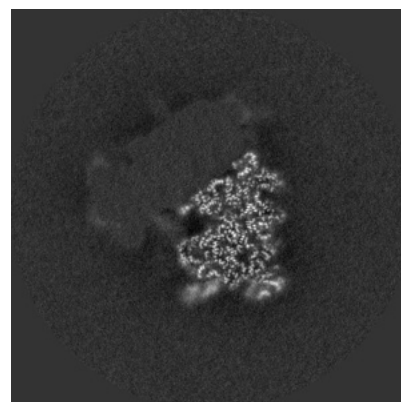
6.2.2 Raw map



X Index: 200



Y Index: 200

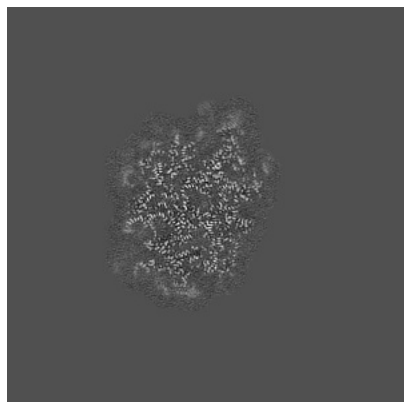


Z Index: 200

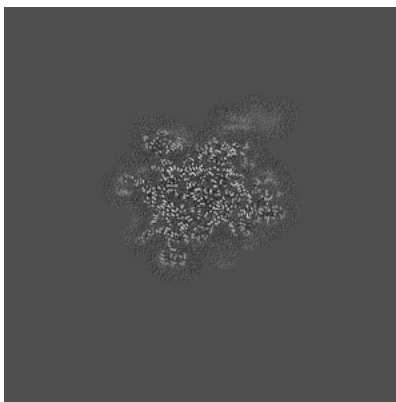
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

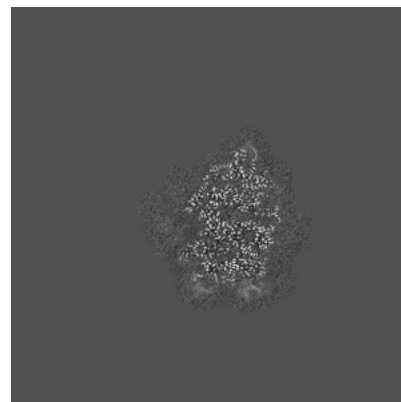
6.3.1 Primary map



X Index: 218

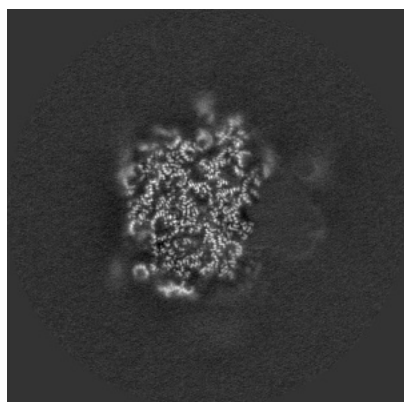


Y Index: 161

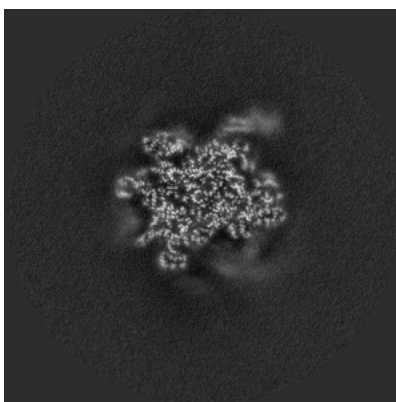


Z Index: 208

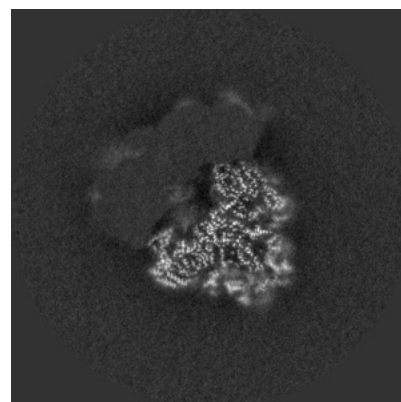
6.3.2 Raw map



X Index: 215



Y Index: 161



Z Index: 176

The images above show the largest variance slices of the map in three orthogonal directions.

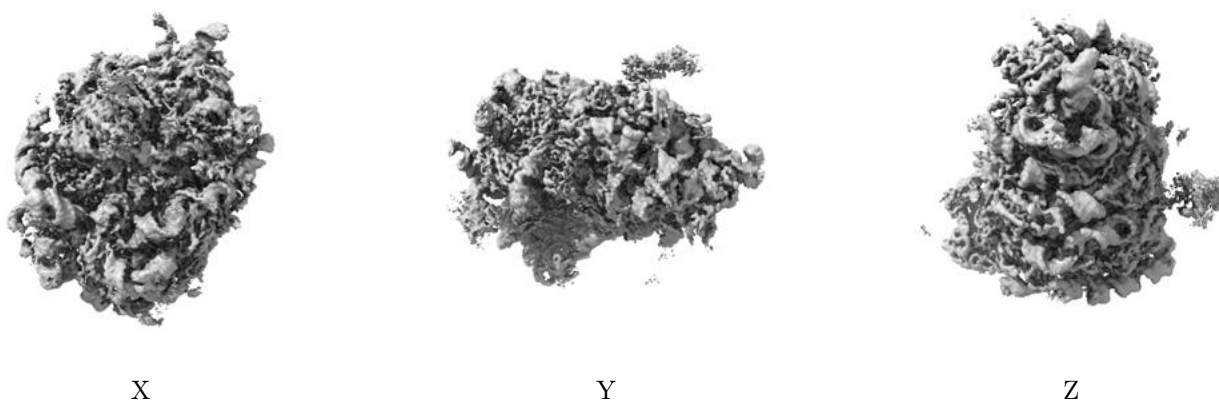
6.4 Orthogonal surface views [i](#)

6.4.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.08. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.4.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

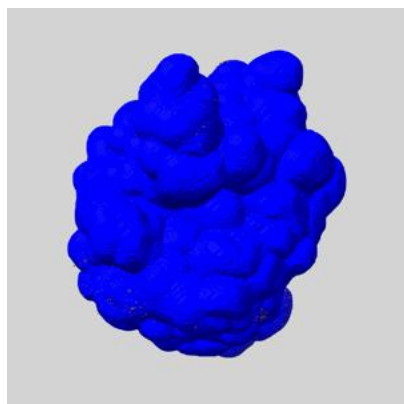
6.5 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

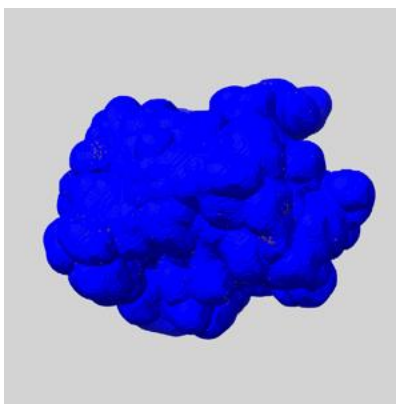
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

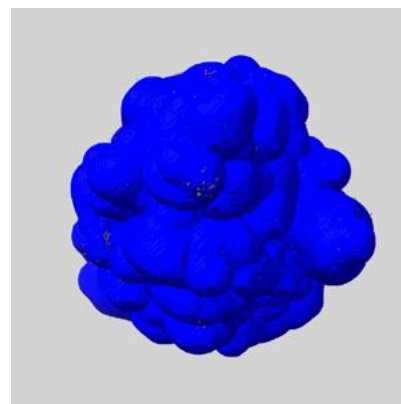
6.5.1 emd_10380_msk_1.map [i](#)



X



Y

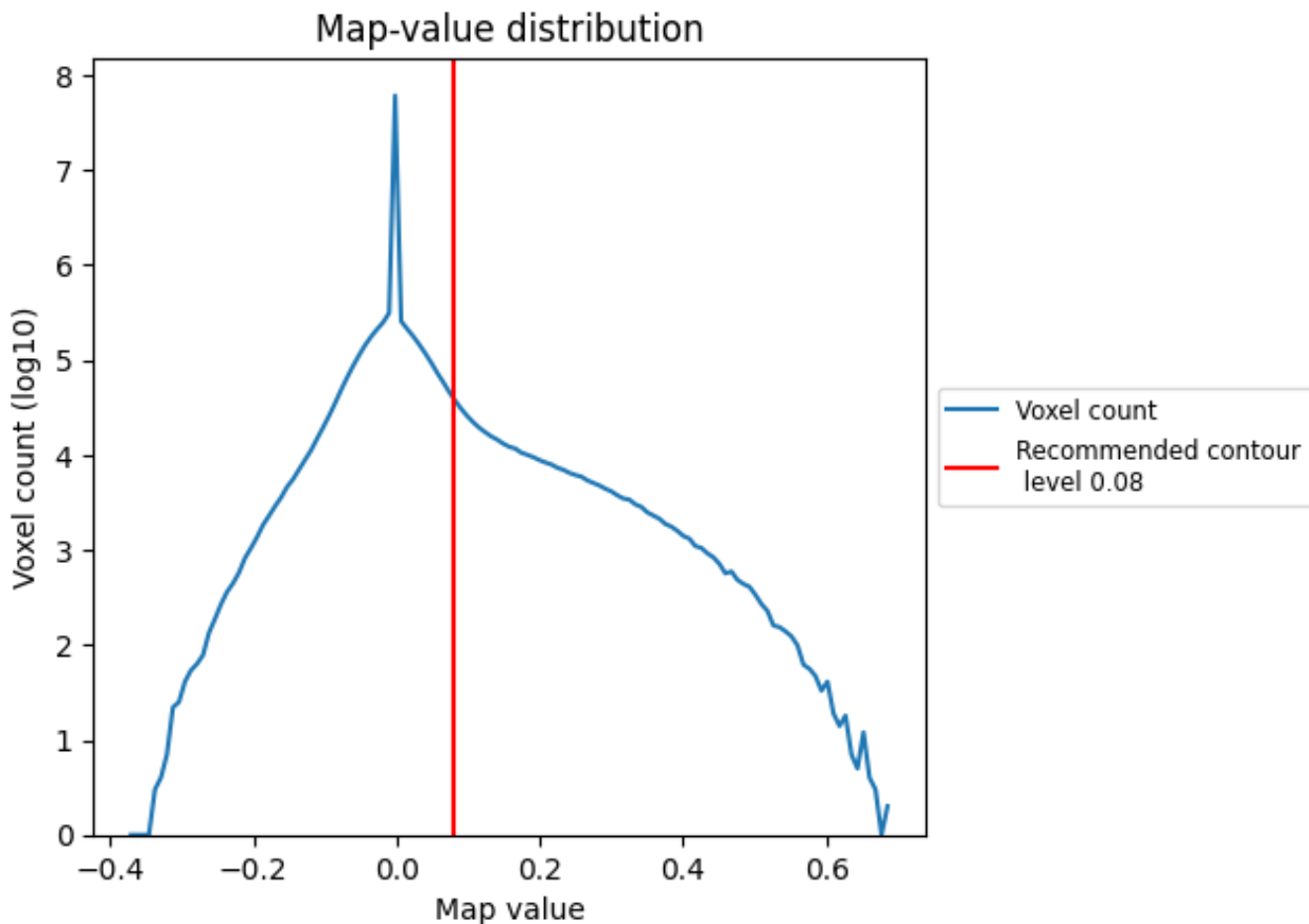


Z

7 Map analysis [i](#)

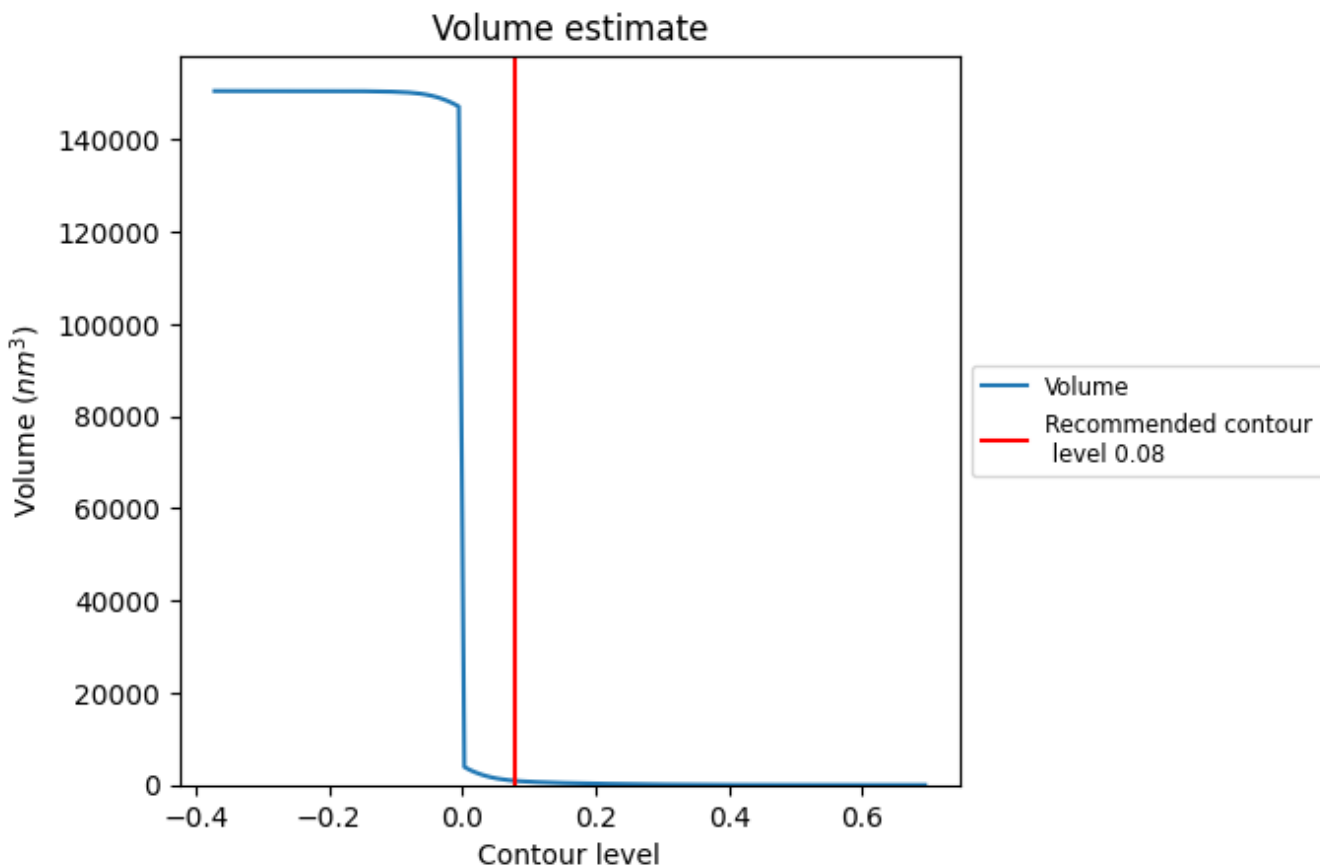
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

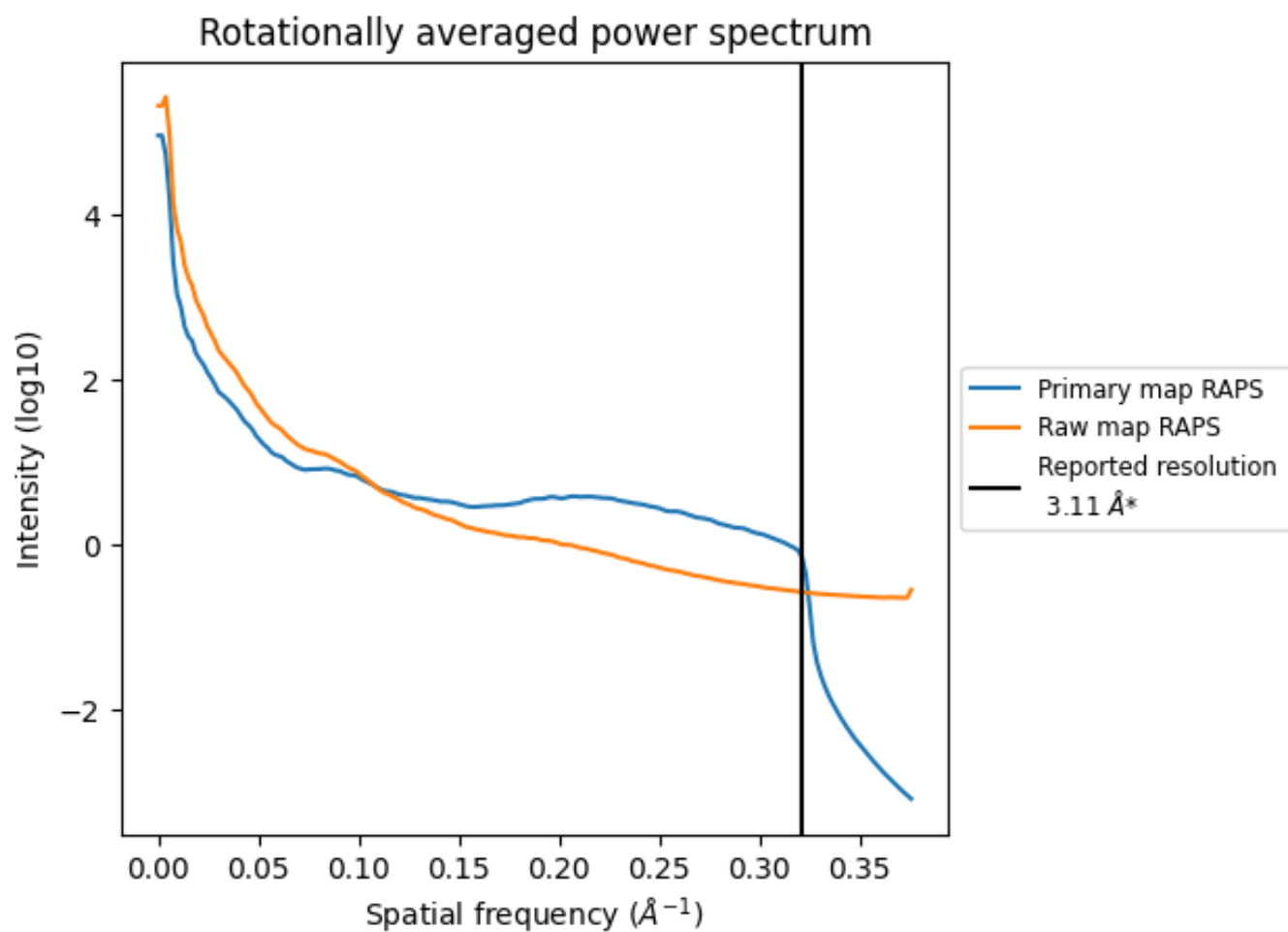
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 897 nm^3 ; this corresponds to an approximate mass of 810 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum i

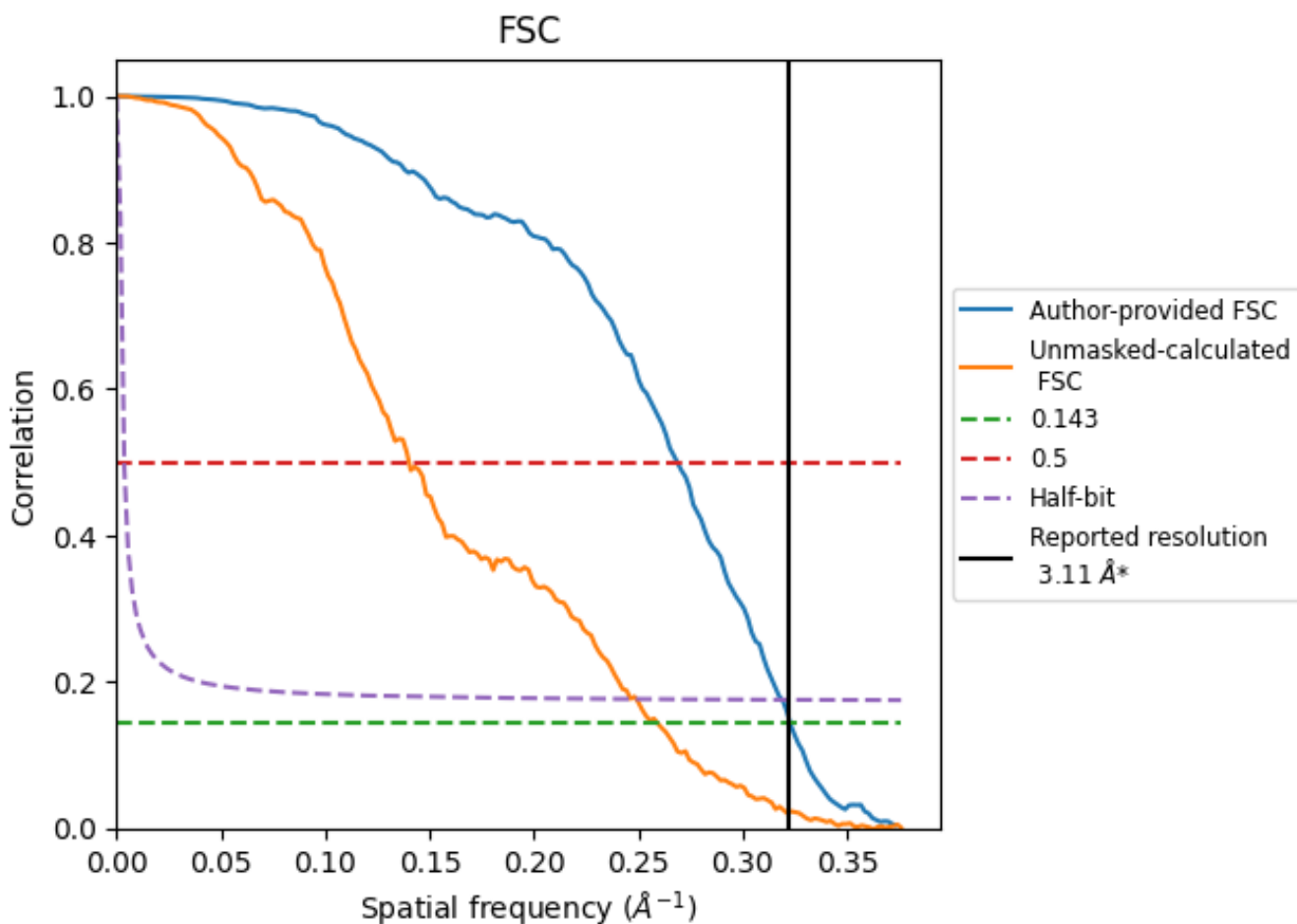


*Reported resolution corresponds to spatial frequency of 0.322 \AA^{-1}

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.322 Å⁻¹

8.2 Resolution estimates [i](#)

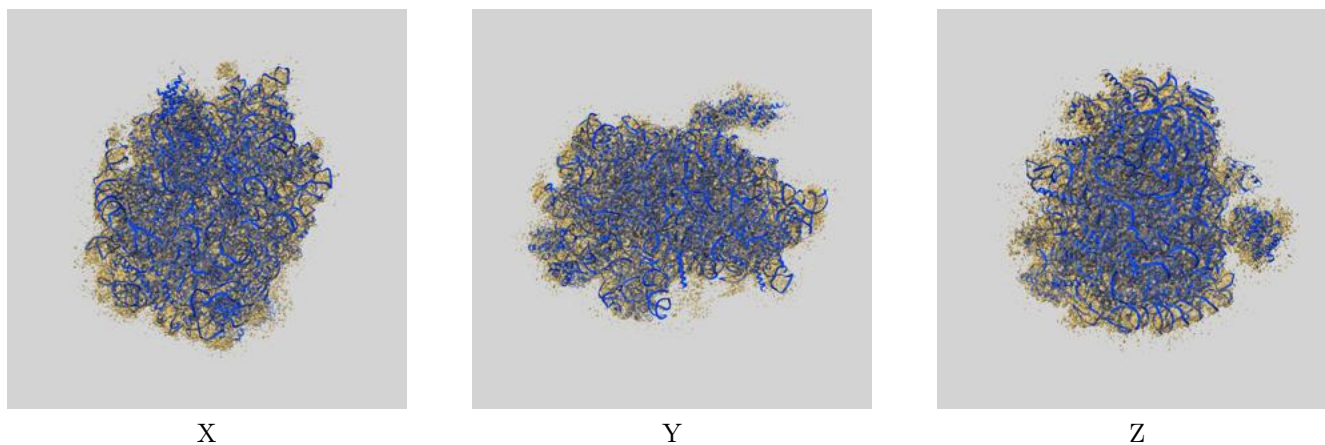
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.11	-	-
Author-provided FSC curve	3.10	3.72	3.14
Unmasked-calculated*	3.86	7.14	4.02

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.86 differs from the reported value 3.11 by more than 10 %

9 Map-model fit [i](#)

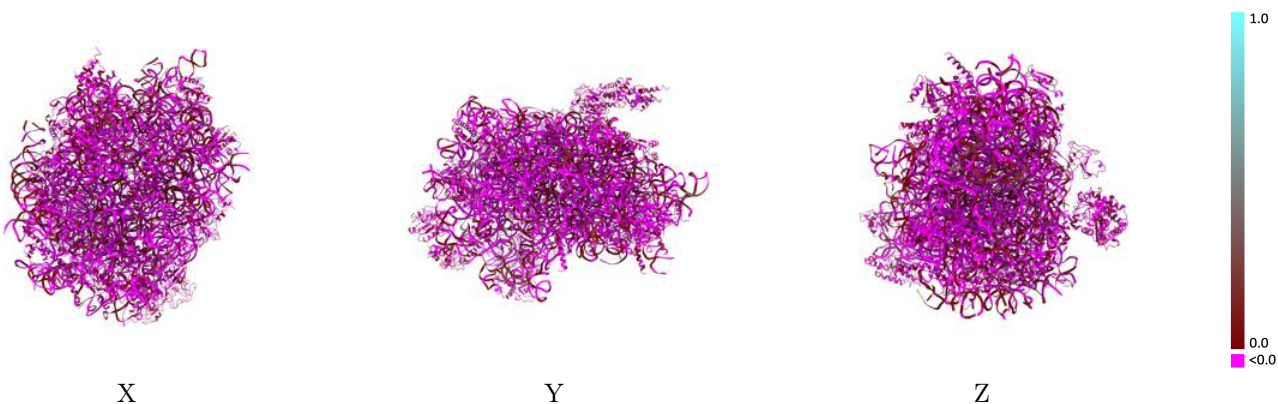
This section contains information regarding the fit between EMDB map EMD-10380 and PDB model 6T59. Per-residue inclusion information can be found in section 3 on page 15.

9.1 Map-model overlay [i](#)



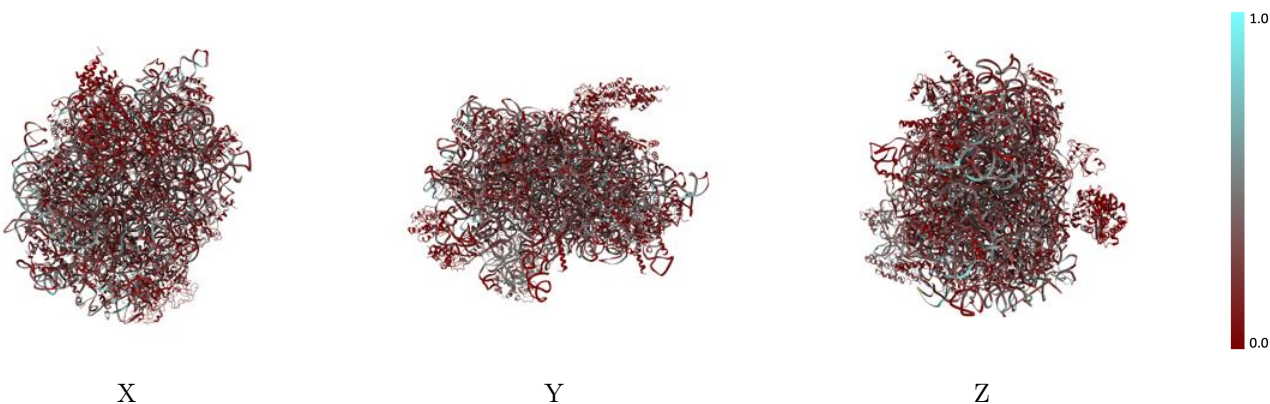
The images above show the 3D surface view of the map at the recommended contour level 0.08 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



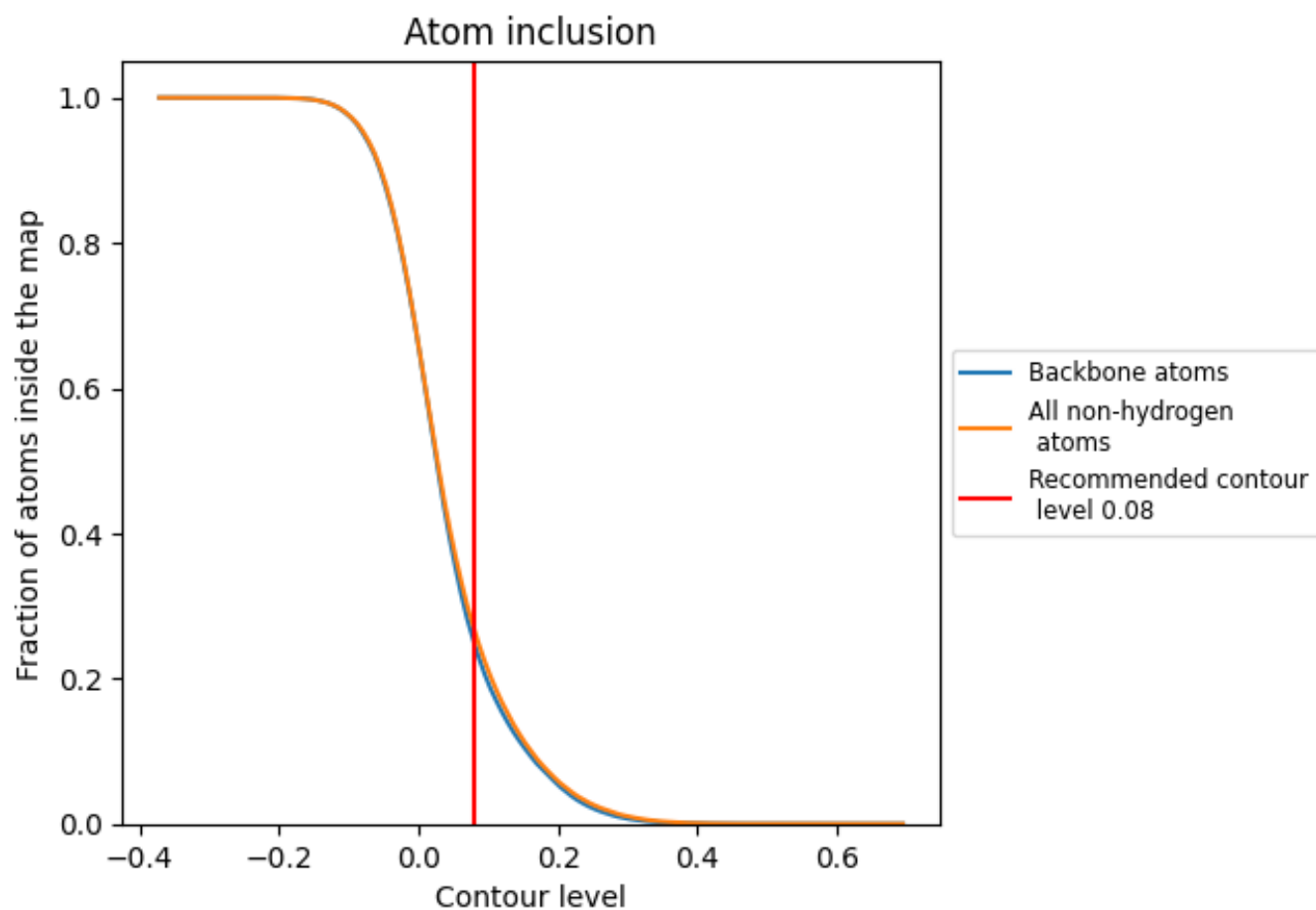
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.08).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 25% of all backbone atoms, 27% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary







































The table lists the average atom inclusion at the recommended contour level (0.08) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.2673	 -0.0680
1	 0.0456	 0.0020
23	 0.0730	 -0.0110
54	 0.3171	 -0.0600
74	 0.3821	 -0.1130
84	 0.3295	 -0.0320
A3	 0.1847	 -0.1380
B3	 0.2074	 -0.0910
C3	 0.2267	 -0.0980
D3	 0.2967	 -0.0630
E3	 0.2210	 -0.0940
F3	 0.2233	 -0.1080
G3	 0.2170	 -0.0680
H3	 0.1928	 -0.0940
I3	 0.2317	 -0.0920
J3	 0.2415	 -0.0470
L3	 0.2319	 -0.0770
M3	 0.2548	 -0.1010
N3	 0.2198	 -0.1120
NA	 0.0558	 0.0400
NB	 0.0225	 0.0230
NI	 0.1533	 -0.1020
O3	 0.2315	 -0.0910
P3	 0.1904	 -0.1070
Q3	 0.1925	 -0.1340
R3	 0.2203	 -0.0660
S3	 0.2571	 -0.0880
T3	 0.2249	 -0.1000
TT	 0.0901	 -0.0270
U3	 0.1740	 -0.0630
V3	 0.1681	 -0.1160
W3	 0.1847	 -0.0880
X3	 0.1819	 -0.0520
Y3	 0.1865	 -0.0900
Z3	 0.2134	 -0.0630



Continued on next page...

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Chain	Atom inclusion	Q-score
a3	 0.2391	 -0.1140
b3	 0.1890	 -0.0920
c3	 0.2513	 -0.0690
d3	 0.1774	 -0.0770
e3	 0.1937	 -0.1160
f3	 0.2197	 -0.1000
g3	 0.1848	 -0.0740
h3	 0.2063	 -0.0630
i3	 0.2412	 -0.0720
j3	 0.2374	 -0.0720
k3	 0.1688	 -0.0380
l3	 0.2178	 -0.0780
m3	 0.2019	 -0.1270
n3	 0.0321	 -0.0910
o3	 0.1901	 -0.1030
p3	 0.2467	 -0.0540
r3	 0.1912	 -0.1180
s3	 0.0700	 -0.0170
t3	 0.0580	 0.0140